Rock Products

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New Montgomery Gravel Plant

Electric Shovels and Storage Battery Locomotives Used in This Operation Which Is in the Greatest Southern Gravel Field

THE latter part of 1923 saw the start of a number of new plants in the important sand and gravel producing area around Montgomery, Ala. One of the largest of these plants, which was put into production about the first of this year, is that of the Montgomery Gravel Co., a subsidiary of the Birmingham Slag Co., of Birmingham, Ala.

The plant is at Arrowhead, a new station 13 miles from Montgomery. The company gave it the name and adopted an Indian arrow-head as a trade mark from the great number of arrowheads that have been found on the property. In early times the flints found in a quarry near this ground were used by the Indians for arrowheads. C. B. Ireland, general manager, has a unique and handsome specimen chipped from a single quartz crystal as clear as plate glass.

The deposit underlies several thousand acres. The presence of so much gravel was not suspected when the property was bought, but sinking test pits has shown it to be practically everywhere and all of the same quality. There is an overburden which varies from 6 in. to 6 ft., with an average depth of perhaps 2 ft. There is about 50% of gravel in the deposit, the remainder of the deposit proper being concrete sand, while the overburden is largely fine sand which has a considerable commercial value in this locality.

There is practically no oversize in the deposit. One of the pictures is a photograph of an average face and comparison with the foot rule photographed shows that practically everything will pass a 2½ screen, thus avoiding the necessity of installing a crusher.

The digging equipment consists of two Marion electric shovels on caterpillar treads. A 20-ton Ohio locomotive crane, with 1½-yd. Page clamshell bucket, is also used for digging although much of the time it handles sand in and out of a stockpile.

Both cars and locomotives that take the dug material from the shovel to the plant are new to the sand and gravel industry. The cars are 50 tons capacity and of a type originally designed to handle iron ore from the mine to the smelter. They are very solidly built of steel and have hopper bottoms and gates. The locomotives are General Electric storage battery locomotives of the 25-ton type, but

Plant of Montgomery Gravel Co. The conveyor and the lines of screens form a right angle. The construction is all of a selected yellow pine timber

Storage battery locomotive with the special type of car used at this plant ready to unload at plant hopper

with the same battery as that used in the 30-ton type. All equipment is standard gage.

These locomotives are handsome and well-constructed machines. As the picture shows, they are double-ended and the cab is furnished with two sets of brake and electric controls so that running in one direction is just the same as running in the other. The braking system is the standard Westinghouse air brake system, with an enclosed electrically driven air pump. Arrangements are made for train line air so that all the cars can be braked as well as the locomotive. But although there is a 2% grade on a part of the line it has not yet been found necessary to use the train line air, the brakes on the locomotive being sufficient.

End view of plant showing screens

These machines have not been in use long enough to get figures by which the cost of hauling may be compared with the costs of the more familiar dinky. But the

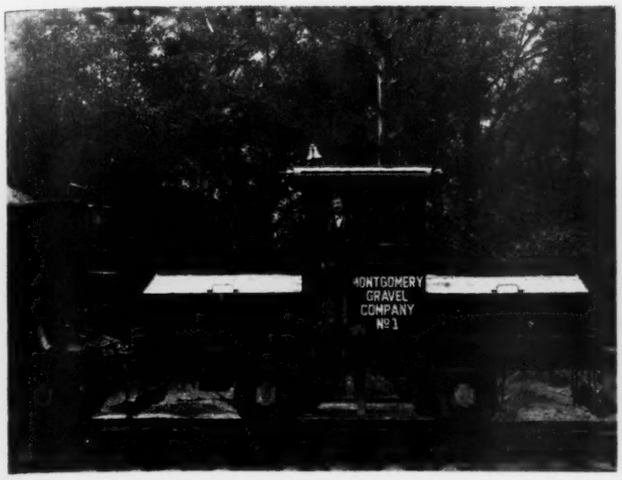
Face of deposit. Compare the size of pebbles with the 1-ft. rule

work as far as noted has been very satisfactory. The battery charging is done at an off-peak period so that current is bought at the lowest rate. One mechanic has charge of both locomotives and runs one of them. The other is run under his direction by a colored helper. Of course there have been no repair costs to date and barring accidents there should be none until the batteries are renewed. It is expected that the batteries will last four years.

At present these locomotives are handling 60 cars of 50 tons capacity in 10 hours over a half-mile track and doing it easily. It is planned to purchase a third locomotive, however, when the full 4000-ton capacity of the plant is reached, as one extra locomotive is often needed for car switching and similar duties.

The decision to install storage battery locomotives was made after a careful study of the adaptability of various systems to the local conditions. At the Birmingham (slag) plant of this company a third-rail system is used and liked very much, but it was judged that such a system was not suited to this case on account of the water that is always found around a washing plant and in the gravel

The sand cones discharge directly into cars



Two of these storage battery locomotives are in use at this plant

C. B. Ireland, general manager, and J. A. Hanners, superintendent

pit. As electric power was to be used throughout the storage battery was the natural choice.

The electric shovel digs that part of the gravel which is above the water line, about half the deposit. It is to be followed up by the crane and clamshell digging below the waterline. It is possible that further experience may show that better results may be had by rigging the crane as a dragline excavator and if so this change will be made.

The use of electric power in every part of the operation gives a very clean and neat appearance to everything about the plant. Cement is furnished by the Alabama Light and Power Co. and three voltages are used. For the pump and larger motors at the plant the voltage is 2300, for the steam shovel it is 440 and for the smaller motors 220. A 110-volt current lights the plant and the houses and office.

The washing plant is of Link-Belt design, as one familiar with such plants would recognize at once. C. S. Huntington, of the Link-Belt Co., did the greater part of the engineering. There are, however, some considerable differences between it and the other plants put up by this company. In the first place the bins are much smaller than are usually seen in a 4000-ton plant, but this is because of the nature of the deposit combined with the market which takes all the sizes made about as fast as they can be loaded.

View of the screening and sand-settling system and loading tracks

The main belt conveyor, by which the plant is fed, is at a right angle with the screening and washing system. This conveyor is 30 in. wide and troughing rolls and idlers have ball bearings of the self-greasing variety. The belt is supplied by an apron feeder from a large concrete hopper into which the cars from the pit are dumped. At the top of the incline the belt delivers to a small hopper from which the feed is sent to two lines of Dull screens.

The first pair of these screens have 1½-in. holes, the second ¾-in., and the third ¼-in. The fourth pair have ¼-in. holes also and these are used to rescreen the oversize of the preceding screens. This double screening of the ¾-in. to ¼-in. renders this size very free from sand, a condition that is not often found where heavy tonnages are being put through.

Water for the screens is supplied by a 10-in. Allis-Chalmers pump throwing 4000 gpm., which is direct connected to a 150-hp. General Electric motor. The deposit does not contain much clay and what clay accompanies the sand and pebbles is of the so-called "soluble" variety that does not

Conveyor structure for the belt that brings the crude material from the track

adhere strongly to the pebbles nor form clay balls. In fact, the washing at this plant is unusually good, the pebbles appearing as clean and round and white as so many eggs.

The sand is settled out in two 8-ft. Dull cones which deliver the dewatered sand directly into cars instead of into bins. This arrangement was adopted because it saved several feet of headroom. When sand is not wanted at the time gravel is being loaded, the sand is turned into the waste trough. The trough can be arranged to flow into a pit which acts both as a sand settler and a storage pit. When there is a heavier demand for sand than for gravel the crane digs this sand with a clamshell and puts it back into the plant where it is rewashed and then loaded by the Dull cones. This arrangement works out to be one of the simplest and most efficient systems of proportioning the output of sand and gravel in accordance with the varying demand of the market although it might not appear so at first sight.

A launder screen is used for separating such fine sand as is needed and either the fine sand or concrete sand may be sent to the cones.

The structure of the plant is built of timber, but of better timber than is usually found in plants as it is all yellow pine with 60% of heart.

Cars are handled through the plant by gravity. There is a double track beyond the plant for 1000 ft. which serves for storing empties. This track is laid with sufficient grade to run the cars to the loading point at a good pace. As soon as a car is loaded it goes to the track scales, about 100 yd. below the plant. These scales are set over a concrete pit and the platform is of reinforced concrete, making a very neat and permanent arrangement. A certified weighmaster stays at the plant and he weighs and bills out the cars as fast as they are loaded.

To show the thought that has been given to details in the design of this plant, one may mention that the oil and tool house has been carefully planned to hold a certain number of full and empty barrels of oil on rocks to which they can be easily loaded out of and into the trucks. A garage is provided and a well-equipped business office occupies a part of the same building.

C. B. Ireland is general manager of the company and J. A. Hanners is superintendent in charge of operations. The main office of the company is in the Shepard building in Montgomery.

Jab with Pin Wins Damage Suit

WALTER BOYD of Webster Groves, Mo., was suing the Glencoe Lime and Cement Co. for $10,000 damages, claiming he was paralyzed as a result of an accident July 26, 1923, while loading a truck.

A physician had previously testified that he had examined Boyd and found no trace of paralysis.

Accepting the invitation of the plaintiff's attorney, the physicians and jurors plunged the pin an inch and a half into the negro's arms without the slightest flinch from the witness. The jury returned a verdict in his favor of $5000.—*St. Louis Times.*

Survey of Portland Cement Prices

A SURVEY of portland cement prices and the economic conditions by which they are determined has just been completed by H. Parker Willis, professor of banking, Columbia University, former consulting economist to the Federal Reserve Board, and John R. B. Byers, instructor in economics at City College.

The results of their study present for the first time a comprehensive picture of the current position of cement prices and their relation to prices of building materials and other commodities.

Facts developed by the authors from all accessible sources also afford a complete refutation of the fallacies common to recent discussion of the price structure in the portland cement industry.

The authors also point out that portland cement prices as of December, 1923, were below the level of all wholesale prices of building materials, as compiled by the Bureau of Labor Statistics.

The current position of cement prices in comparison with other basic articles used in building and currently traded in on a large scale is shown in a published table of increases as of December, 1923, over 1913.

Taking into account all the price data available, the analysis shows:

Portland cement prices averaged for the United States in December, 1923, 174.9, or 74 9/10 points above their level in 1913.

Portland cement prices taken at 174.9 are thus 3 1/10 points below the level of all wholesale prices for building materials as furnished by the Bureau of Labor statistics, the index of all materials being 178, based on prices in 1913.

Portland cement prices vary as much among themselves (as between different parts of the country) as is true of many other standardized articles, e. g., brick, nails, etc.

Changes or variations in portland cement prices occur with somewhat the same frequency as do changes in standard or recognized prices in other similar industries, e. g., steel and the like.

There is at any given moment a distinct tendency to uniformity, except for variations due to differences in point of delivery.

The broad conclusions reached by the economists as a result of the whole subject are stated as follows:

In closing discussion of portland cement prices it is now desirable to outline the conclusions which have been broadly reached. These are as follows:

The uniformity which has been noted as existing in prices charged by different companies is not greater than that which exists in a variety of other standardized industries.

Such uniformity as exists is apparently the result of special conditions of manufacture and trade which make it practically impossible to maintain very wide variations of value over any considerable period.

Uniformity itself is not theoretically an evidence of combination or even a fact which tends to create a presupposition in favor of combination.

If uniformity co-existed with stability of prices over considerable periods, and if at the same time it was found that such uniform and stable prices resulted in a high return to the producer, a case in favor of agreement as a basis of price making might be regarded as prima facie established.—*Baltimore American.*

Canadians Hunting Phosphate Rock

A CALL for phosphate rock, one of the chief sources of mineral fertilizer, is being sent out by the Consolidated Mining and Smelting Co. of Canada, with the hope of locating beds of this mineral in this province. Copies of an article prepared by R. M. Macaulay of the company's engineering staff at Tadanac have been distributed to prospectors and others interested, and Mr. Starkey has samples of the rock for inspection. It is announced that "this company is anxious to obtain phosphate beds and will make free analysis for phosphoric acid for prospectors who send samples to their assay office at Trail, plainly marked with the name and address of the prospector, and giving the location from which the samples were obtained."—*Vancouver, B. C., Sun.*

Canadian Discovery of Phosphate Rock

AN interesting discovery of phosphate rock has been made near the shore of Francoise Lake, just south of the Grand Trunk Pacific railway. The Department of Colonization of the Canadian National has taken an interest in the discovery, and has had an analysis of the rock made at the laboratory of the Department of Mines, Ottawa. The following is the result: Phosphoric acid, 32.41%; lime, 42.75%; magnesia, 1.85%; ferric oxide, 3.41%; manganic oxide, .17%; alumina, 1.89%; silica, 5.60%; fluorene, 3.27%; loss on ignition, 9.24%. As soon as weather conditions permit, further exploration will be made to determine the extent of the deposit.—*New York Journal of Commerce.*

New Virginia Crushed Stone Plant

Radford Limestone Corporation Opens New Quarry and Begins Production with a Well-Designed Modern Plant

By T. F. Agthe

Engineer with Worthington Pump and Machinery Corporation

A LARGE limestone quarry has recently been opened on the New river, near Little river in Pulaski county, Va. The property, which includes a huge bluff of high-grade limestone, affording an almost inexhaustible stone supply was acquired by The Radford Limestone Corporation in the spring of 1923. Development work was started soon after and the crushing plant was given its initial run on March 3 of this year and was placed on a regular producing basis several weeks later.

The Limestone Quarry

The general view of the quarry gives an idea of the quarry development at the time that the plant was put into operation. The large amount of stone which has been shot down and prepared for crushing, brings out clearly the development work acomplished by the company in order to insure a continuous production.

The quarry presents a number of operating difficulties which have been overcome successfully by the management. The most striking of these is the method employed in stripping. It was decided that the demands of the trade are such that a clean, high-grade stone is essential and in order to meet these trade requirements the management made every effort to prepare the stone in the quarry so that the products of the plant will be uniform and of the highest quality. The absence of mud seams made this possible, although it has been found necessary to strip the stone thoroughly. This stripping is carried on by hydraulicking.

The water for stripping is pumped from the New river through a 6-in. pipe line to a monitor, equipped with a 1-in. nozzle. A pressure of 200 lb. is maintained at the nozzle which insures efficient removal of the overburden. In the clean-up, before well drilling is begun, the final stripping is carried on by using in place of the monitor, a fire hose, which permits a jet of water to be directed into the small irregularities of the rock surface. In this way the rock is made thoroughly clean before it is prepared for the steam shovel.

The pumping station is located near the river and consists of two duplex pumps, one

Well drill. Crushing plant below in background

General view of the crushing plant of the Radford Limestone Corporation, showing the excellent loading facilities

unit pumping the water from a river to a large tank. The other pump, which is a high pressure unit, pumps the water from the tank to the nozzle.

A Model 61 Marion steam shovel is used for loading the material in the quarry. It is equipped with a 2½-yd. dipper of the Mesaba type and loads the rock into a 4-yd. Kilbourne & Jacobs side dump cars, 36-in. gage, in which it is hauled to the primary crusher by 9x14-in. 12-ton Porter saddle tank locomotives. The gage of the quarry tracks throughout is 36 in.

Crushing Plant

During the last decade, many factors have been at work in the development of the stone industry. The general use of concrete for building and general construction work, the development of the automobile with the attendant development of permanent highways, the increasing use of pulverized limestone as a fertilizer, and the wider use of rock ballast for the maintenance of railroads have all developed the stone business to astonishing proportions comparing the situation with conditions that existed a few years ago.

These developments have made the stone industry one of national importance, and with the growth of this business the necessity to reduce the operating costs has been felt keenly as in all other enterprises. The general use of the steam shovel has resulted in the development of large shovel units, so that the modern quarry operator now reduces his operaitng costs by using large shovels equipped with large dippers; blasting down huge quantities of stone in a single blast and arranging his crushing plant so that a minimum of labor for handling and for secondary blasting is required.

The officials of the Radford Limestone Corporation gave these facts careful consideration in the design of the crushing plant and it was decided to install a primary crusher of sufficient size to handle the stone from the quarry so that a minimum of secondary blasting would be required.

In the crushing plant, stone is fed to a 42-in. Worthington Superior McCully gyratory crusher which is a short shaft crusher of great strength and ruggedness. This machine is the primary breaker and reduces stone small enough to be fed to the secondary crushers without further crushing. The primary crusher will take all of the stone that can be loaded with the Model 61 Marion steam shovel equipped with 2½-yd. dipper and this insures very little attention at the hopper.

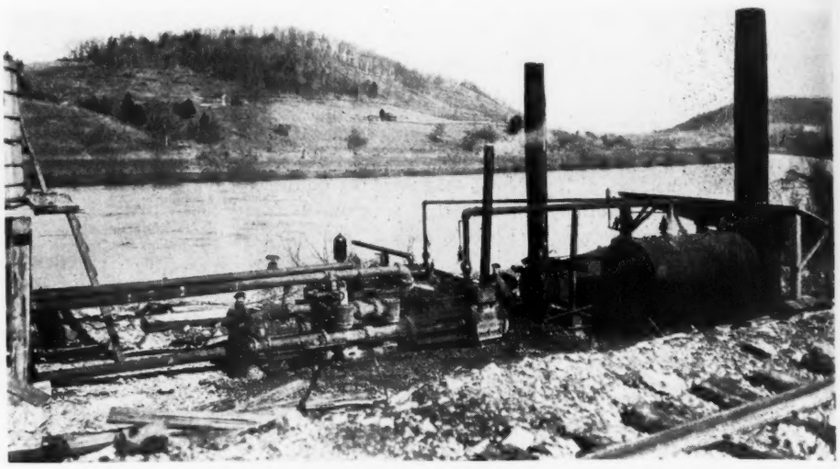
The crushed material from this machine is conveyed to a 60-in. diameter Worthington McCulley all roller type scalping screen, by means of a belt conveyor built on an angle of 18 deg. This conveyor is equipped with five-unit ball bearing carriers. The belt is an eight-ply rubber conveyor belt with a 3/16-in. rubber covering.

The oversize or ejections from the scalping screen is fed to the two reduction or sceondary crushers by gravity, the stream to these crushers being so divided that each reduction crusher gets the proper proportion of material. The smaller of the two machines is a 10-in. Worthington Superior McCully fine reduction crusher having a capacity of approximately 110 tons per hour. The larger machine is an 8K Allis-Chalmers Gates type gyratory crusher which has been equipped with a reduced throw eccentric and adapted to secondary crushing. The undersize from the scalping screen is fed to a 30-in. belt conveyor which conveys this material to the finishing screen. The product of the two reduction crushers is returned to the scalping screen by a 30-in. return belt conveyor connecting with the large 36-in. belt conveyor from the primary crusher, so that the scalping screen oversize, after having passed through the reduction crushers, is again returned to the screen.

This arrangement insures a sized product for the finishing screen which makes it possible to handle a large tonnage in this screen, which is equipped with a 10-ft. dust jacket. The products made in this plant are especially well sized, showing that the screening arrangements have been worked out correctly.

There are no elevators used in the plant and a system of signals and the remote control of the motors has made it possible to operate the plant with the minimum number of employes. The maximum tonnage of the plant is about 1800 tons in 10 hr. although under favorable conditions it is quite possible that this tonnage will be exceeded.

The management has made provisions in the design for the installation of a 6-in. Worthington fine reduction crusher which is similar in design to the 10-in. crusher described but which will have a finer setting so that if desired, a larger percentage of

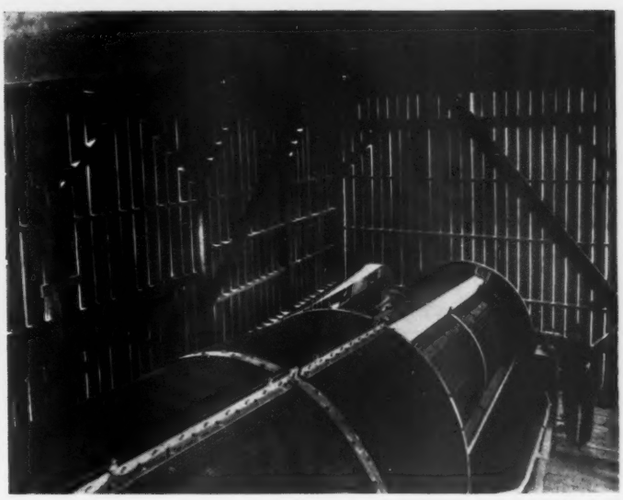


Pumping station on New river with duplex pump which pumps the water for stripping

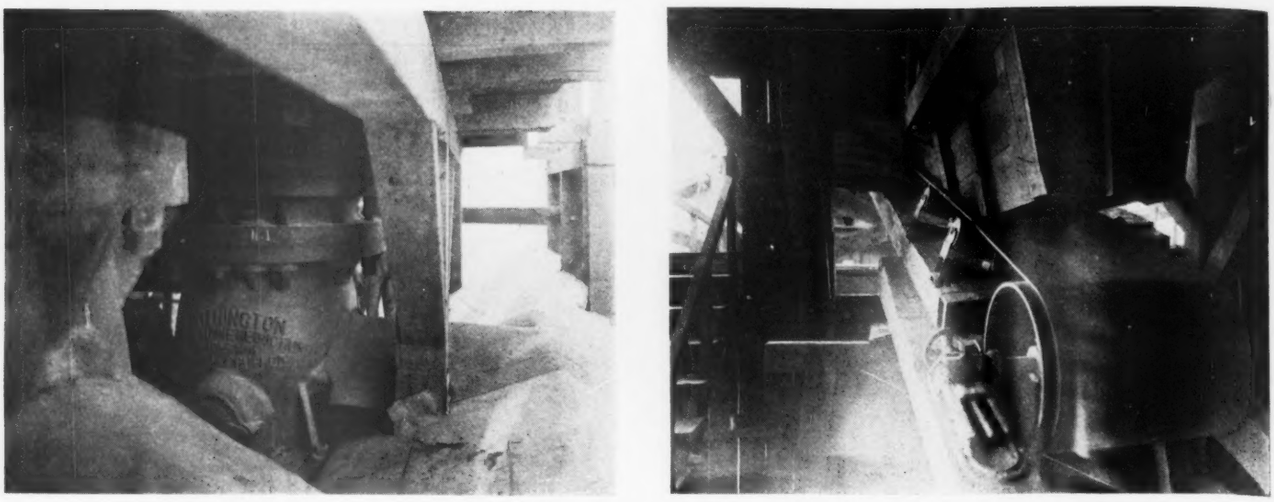
End view of crushing plant showing primary crusher in foreground and belt conveyor to screening plant

Left—Hydraulic stripping using "Monitor." Right—Drilling for secondary blasting

Left—General view of the quarry. The crushing plant shows in the background to the left. Right—Steam shovel loading stone in the main quarry



Left—The 42-in. gyratory crusher shown with enclosing structure partially completed. Right—Close-up of finishing screen and dust jacket



Left—The 10-in. fine reduction crusher. Right—30-in. elevator taking material from scalping screen to sizing screen

small sized stone can be made. Preparations have also been made to install a Hum-mer screen for the separation of the fines from the finishing screen so that a ½-in. ring size product can be made with the dust taken out. This dust will be further separated into asphalt filler and agricultural limestone. With these arrangements the Radford Limestone Corporation will be in a position to produce all sizes of stone from 5-in. ring size down to ½-in. ring size.

The motors throughout the plant were furnished by the General Electric Co. and each large unit is driven by individual motors, except the two screening units which are driven in connection with the belt conveyors discharging into these screens. The conveying equipment was furnished by the Stevens-Adamson Manufacturing Co. of East Aurora, Ill. The three belt conveyors are equipped with ball bearing carriers and with extra heavy rubber belt. All of the crushing machinery, except the 8K crusher, was furnished by the Worthington Pump and Machinery Corporation, 115 Broadway, New York, and the construction work was carried on under the drection of the Radford Limestone Corporation .

The plant was designed by the engineering department of the Power and Mining Machinery Works of the Worthington Pump and Machinery Corporation, Cudahy, Wis., and complete working drawings were furnished for plant construction.

The Radford Limestone Corporation have adopted very thorough methods in the operation of this property and by the use of new and modern equipment throughout the plant, have prepared the way for the production of material on a large scale with a continuity of operation which will enable the plant to fill the market requirements at all times. The general offices of the company are located in the First National Bank building, Roanoke, Va. The officials are: Taylor Rogers, president and general manager; L. R. Hammond, vice-president and treasurer; W. H. Faulconer, vice-president; Warren W. Cline, secretary and assistant treasurer, and J. H. Harris, superintendent.

The 42-in. gyratory crusher in place on its foundation

Lime Kiln and Quarry Sold at Auction

THE Spring Garden Marble and White Lime Co. property, about midway between Eugene and Etterville, Mo., and consisting of approximately 40 acres, was sold at the court house door in Tuscumbia under a deed of trust given by the company to J. Pillman and I. Pillman, beneficiaries. John F. Grauel, named in the deed of trust as trustee, refusing to act, the sale was made by Sheriff John Kinder. Only one bid was made, that by J. Pillman, for $10,000, and he again becomes owner.

The value of this property has heretofore been due to the fact that a good quality of stone suitable for lime was located here. For a number of years several kilns were operated here and lime was shipped to many places. The buildings and machinery as well as the kilns are still on the premises, although the plant has been idle for some time.—*Tuscumbia (Mo.) Autogram.*

Mexican Graphite Mines

CHARLES C. CUSHMAN of Otsege, Mich., has located extensive territory in the graphite region of El Lapiz, Sonora, Mexico, and will shortly commence operations. His property lies near the Packard and Packard Extension mines, which produce large quantities of graphite.

The last few years three American concerns have been working the rich graphite mines near La Colorado, Mexico.—*El Paso (Texas) Herald.*

Nature, Preparation and Use of Pulverized Coal

Part XI—Construction and Method of Operation of Types of Commercial Pulverized Coal Burners

By Richard K. Meade

THE arrangement of feeder, injector and fan employed by the writer for rotary kiln heating is shown in Fig. 30. It is made of standard pipe fittings and parts. The worm is a piece of half pitch screw conveyor and the extension of this beyond the bin is encased in a piece of ordinary wrought iron pipe. The bearings are made of cast iron and bolted on the pipe flanges. The worm is driven by a variable speed motor through an encased worm gear. When a motor can not be conveniently used the disc and wheel arrangement previously described is used. The injector is made of standard pipe fittings and consists of a cross-tee which the air cone fits as indicated. The upper branch of the cross receives a nipple which connects with the coal feed. The branch below this receives a pipe which rests on the floor and serves to help support the burner, while the fourth branch connects with the furnace. Air is admitted above the coal feed. If more air is desired it may be admitted back of the air cone as indicated in Fig. 31.

Steam and High Pressure Air Burners

Occasionally injectors were operated by means of steam or compressed air and Fig. 31 shows an injector suitable for this purpose. (An injector similar to those shown in Figs. 29 and 30 except that a steam pipe takes the place of the cone described above may also be employed.)

The high pressure burner shown consists of a series of cones placed one within the other. The orifice of each cone being somewhat larger than the preceding one. High pressure air or steam at 60 to 80 lb. is led into the first cone at *HPA*. As it expands it sucks a portion of air through the openings *AA*. As it leaves the first cone it expands again sucking a further portion of the air through the openings *BB*. As it leaves the second cone and enters the third one, it expands a third time sucking a third portion of the air through the opening *CC*. Coal is fed through the openings D_1, D_2 and D_3, from a worm feeder above similar to that employed for the low pressure burner. In this burner the great difficulty is, of course, to so proportion the coal that each opening will deliver some to the burner. The difficulty of doing this will be appreciated. It is much more expensive to operate a burner with high pressure air than with air from a blower so that these high pressure burners are not now used to any great extent.

Where steam is employed a large volume of air is sucked into the burner and this air is really the carrying medium for the coal.

Chas. A. Matcham, manager of the Lehigh Portland Cement Co. in 1908 took out a patent on a method of introducing pulverized coal into the cement kiln by means of the draft of the latter. His "natural-draft" system consists in feeding the coal from a bin by means of a worm in a thin sheet across a slit in the hood or end housing of the kiln. Air sucked in by the draft of the kiln through this slit picks up the coal here and carries it into the kiln. No fans or blowers are required and the necessary draft is secured by means of a stack of the proper height. This system with modifications might be used to advantage where a reducing flame of mild intensity is required.

Another burner which was developed for

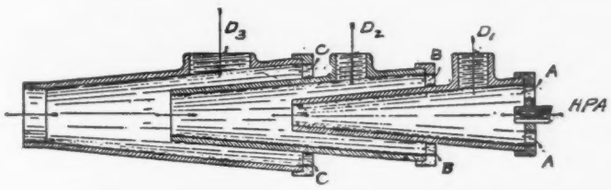


Fig. 31—Burner for high-pressure air or steam

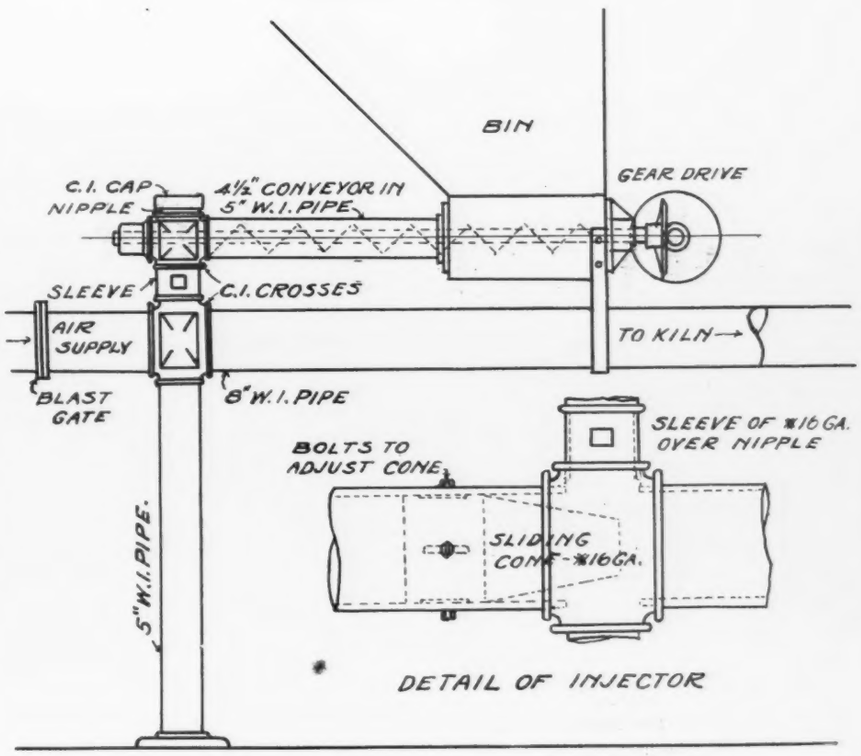


Fig. 30—Burner and injector made of standard pipe fillings

cement work is that devised by W. R. Dunn, superintendent of the Vulcanite Portland Cement Co. This burner is intended to give a more intimate mixture of air and coal than is secured by the ordinary feeders. In order to secure this result, instead of dropping through one opening in the bottom of the conveyor trough, the coal falls through a number of such openings, while air is sucked in above and passing down through these openings mixes with the fuel.

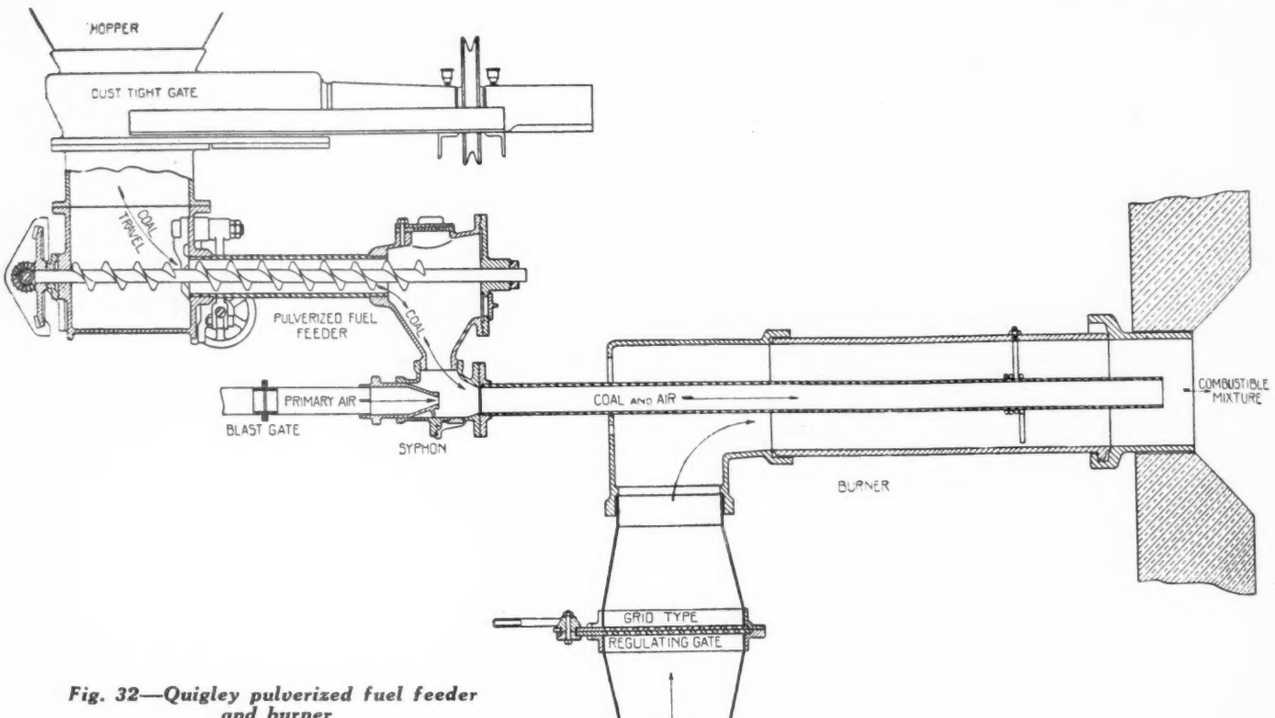


Fig. 32—Quigley pulverized fuel feeder and burner

Practically all of the firms making a specialty of pulverized coal installations have developed burners. Most of these are modifications of the standard cone and worm of cement kiln practice, with some additional features designed to regulate the air supply or to give better mixing of the air and coal. In a few of the burners, provision has been made for decreasing or increasing the air supply as the supply of coal fed to the burner is diminished or increased. One of the first forms of burner developed for metallurgical work was that of Culleney which was used by the American Foundry Co. of Lebanon. Another early type was that of Knox used by the Erie Malleable Iron Works. The burners which are more used now, however, are the Fuller, the Quigley and the Lopulco burners, all of which are modifications of the cement burner. Outside of a somewhat neater arrangement of the parts than is usually secured in the cement mills, it is doubtful if they possess any great advantage over the latter. The feeder consists of the ordinary worm which is driven usually directly or by means of a link drive chain from either a variable speed motor or through a variable speed transmission. The burner proper consists essentially of two tubes, one inside of the other. The inner tube is provided with a vertical opening and a horizontal opening. The vertical opening is connected to the pulverized coal feeder. The horizontal opening is connected to the air supply. A blast gate permits the control of the latter as desired. The outer tube is fitted with an adjustable register by means of which the quantity of atmospheric air drawn into the burner may be regulated.

The Quigley controller is shown in Fig. 32. While the feeding mechanism here is a worm, the method of controlling the amount of coal fed is somewhat different from that in the standard worm feeder. In the case of the Quigley controller, the amount of coal is varied by means of two shutter vanes operated by a hand wheel or a hand chain wheel. These shutter vanes close around the feed screw and are arranged so as to restrict or enlarge this opening as desired.

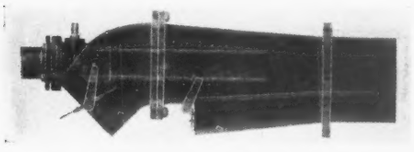


Fig. 34—Lopulco triplex burner

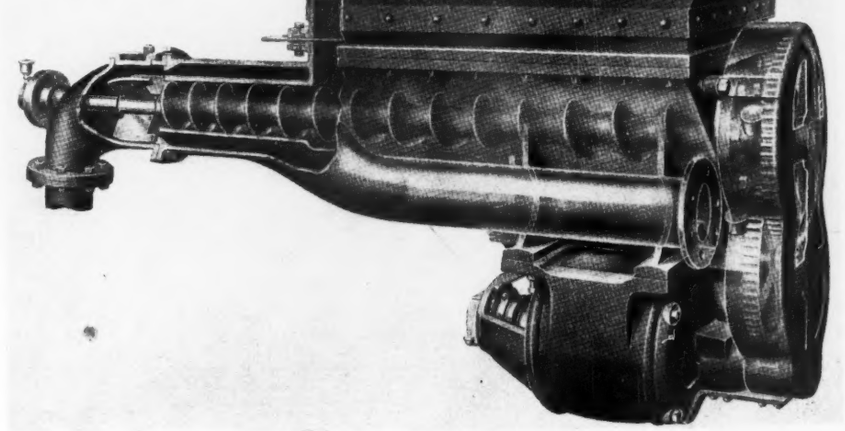


Fig. 33—Lopulco standard feeder

The quantity of fuel passing through the controller is, of course, proportional to this opening.

The injector employed is similar to that described for the preceding types of burner and the feeder shaft is driven by a pair of encased bevel gears. The Quigley controller is made in sizes ranging from 200 to 3000 lb. capacity per hour.

The Quigley burner is provided with a special grid-type air gate to prevent air streams and eddy currents. The flow of air is controlled by the use of two overlapping grids permitting the air to occupy the entire area of the pipe instead of hugging one side when the gate is partly closed.

The Lopulco feeder is shown in Fig. 33. A worm driven by a variable speed motor is employed for feeding the coal from the bin but instead of dropping the coal into an injector, the worm casing enters the blast pipe directly and the coal is delivered in the center of the air column. Paddles are placed at the end of the feed screw which are designed to break up the coal, should this have a tendency to cake, and to mix the coal and air.

Fig. 34 shows a common type of Lopulco burner. This consists of three rectangular chambers, surrounded on four sides by air ports. Through the center of each inner chamber is a 3½-in. fuel nozzle which terminates 9¾ in. from the outlet, thus giving the ensuing mixture a chance to expand just prior to its emergence into the furnace. The secondary air is admitted through the two air ports of the burner the amount being controlled by means of the vanes shown. About 10% of the air for combustion enters with the coal as the carrying medium from the feeder. The remainder of the combustion air enters through the air ports in the burner and through the auxiliary air openings in the front of the furnace.

(To be continued)

Meeting of Portland Cement Makers

Portland Cement Men Hold Spring Meeting at Los Angeles —San Antonio Portland Cement Co. Wins Safety Trophy

By George P. Miller

THE high light of the spring meeting of the Portland Cement Association which was held at the Biltmore hotel, Los Angeles, Calif., May 19 to 21 inclusive, was the awarding of the trophy by the association to the San Antonio Portland Cement Co. for having the best record during 1923 of the lowest number of days lost due to plant accidents per 100,000 man hours worked.

The committee and the bureau of accident prevention and insurance have been hard at work for several years and with the co-operation of the member plants each year has shown a decrease in accidents; last year showed an improvement of 17% over the year previous. A carefully prepared chart in which each plant was represented by a number (the corresponding names being known only to the committee) showed the basis on which the award was made. One plant on this chart shows no days lost from accident, but it was in operation only five and one-half months and the rules governing awarding of the trophy provide that each plant shall operate at least six months of the year in order to compete. Following are the rules

RULES GOVERNING AWARDING OF THE PORTLAND CEMENT ASSOCIATION'S SAFETY TROPHY

1. The trophy shall be awarded for each calendar year to the member plant with the lowest number of days lost due to plant accident per 100,000 man-hours worked.

2. Only lost time accidents shall be considered in the competition meaning accidents due to which the injured lose more than the remainder of the day or shift in the course of which the accident occurred.

3. If it becomes necessary to consider permanent disability accidents in order to select the winning plant, such permanent disability shall be charged to days lost in accordance with the rules adopted by United States bureau of labor statistics.

4. Only those plants reporting accidents as well as man-hours shall be eligible to compete.

5. A plant shall have been in actual operation at least six months of the year in order to compete.

6. The accident reports submitted to the bureau of accident prevention and insurance of the Portland Cement Association shall bear consecutive plant report numbers either beginning with No. 1 each year or continuing the numbers of the preceding year.

S. F. Barrera, San Antonio Portland Cement Co.

7. In determining whether accidents are chargeable to plant the judges shall be guided by the rulings of the various compensation boards.

8. The trophy shall be awarded to the winning plant at each spring meeting of the association. It shall be presented to two delegates chosen from the employes at the plant and all the expenses of these two men in attending the spring meeting shall be paid by the association as a part of the prize.

9. Each winning plant shall have its name and the year in which it won the contest inscribed on the trophy.

10. The trophy shall be placed in a safe and conspicuous place at the winning plant so that the employes may see it as often as possible.

S. F. Barrera represented the San Antonio Portland Cement Co. and to him a photograph of the trophy was awarded, for the trophy itself will be cast in concrete and measure about 8x6 ft. The trophy was designed under competition by art students of the Chicago Art Institute, and is exceedingly appropriate in emphasizing that "Safety Follows Wisdom."

H. G. Jacobsen, manager of the accident prevention and insurance bureau, pointed out that, first: coal dust; second, working in bins, and third, handling quarry and railroad cars were the dangerous things which every plant must guard and that most of the accidents were from these causes. The general discussion brought out many interesting experiences. Lindley C. Morten, of the Phoenix company, related a strange accident at his plant in which two men were killed by an unknown gas while working in a coal bin.

Ernest Ashton, of the Lehigh company, stated that by using flat bottom coal bins and placing the screw conveyor in the body instead of at the bottom of the bin would prevent arching, which, in turn, would prevent coaking and combustion, and that with this treatment his plant never experienced gas creating in the bins. Because of the importance of having each member plant knowing the causes of accidents as soon as possible a resolution was passed that a bulletin be sent to each member giving the complete facts with sketch or picture if possible of the unusual accidents as they happen.

President Kelly in his address laid stress

SAFETY FOLLOWS WISDOM
PORTLAND CEMENT ASSOCIATION
SAFETY TROPHY AWARDED
SAN ANTONIO PORTLAND CEMENT CO.
FOR THE BEST SAFETY RECORD MADE
BY A MEMBER. PLANT IN 1923

The safety trophy is 6x8 ft. and cast in concrete

upon many fundamentals and the relation of good government and good business. He stated that the members of the association made one-half of the cement used in the world, and that the great leadership in the United States shown in both production and consumption of cement over the rest of the world was in no small measure due to the service of the association in its work of pointing out the new and correct uses of cement.

The usual committee reports and the minutes of the annual meeting were approved and adopted. The resignation of F. L. Williamson, of the Dewey plant, as director of the association, was accepted. No new business nor unfinished business was brought before the meeting.

Two papers were read that were appreciated by the members, "Historical Sketch of the Development of the Cement Business in Southern California," by C. L. Carman of the Riverside Portland Cement Co., and "Synchronous Motors for Cement Mill Drive," by G. E. Cassidy, General Electric Co.

The Los Angeles entertainment committee, in charge of F. H. Powell, Norman Macbeth and Wilmar Evans, arranged one of the finest programs given at any of the meetings. The committee met the delegates at San Bernardino and served them with oranges and refreshments and flowers for the ladies.

On Thursday, May 22, the entertainment committee took the delegates by autos to Hollywood for a visit to the movie studios, and later to Santa Monica, Ocean Park and Venice. The golfers held their tournament on Friday, some fine prizes being provided.

The Southwestern Portland Cement Co. will be hosts to the members at an excursion to their plant at Victorville, Sunday, May 25. Special cars will be chartered for the occasion.

The banquet, held Wednesday evening at the Biltmore hotel, was an occasion marked with fun and laughter and a good deal of handshaking by the old timers of the industry.

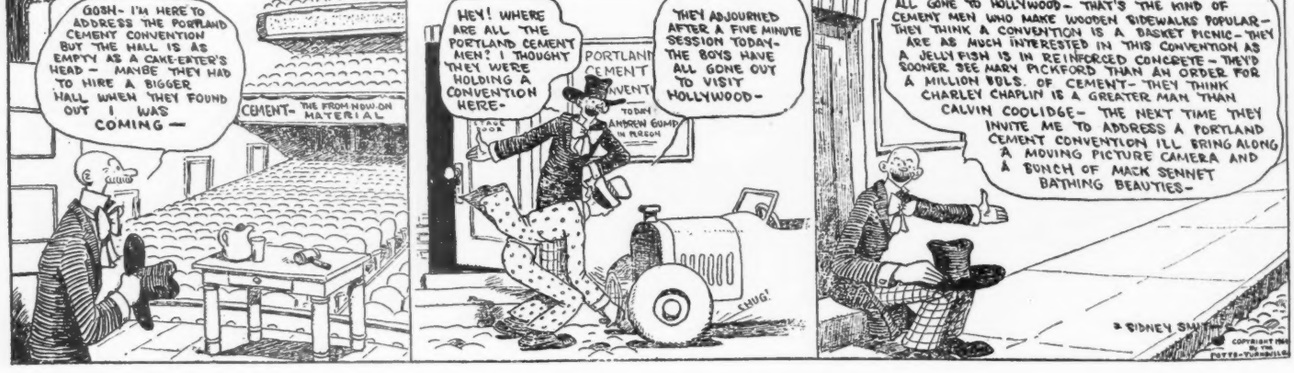
From the registration it will be noted that the attendance was very good, considering the fact that so many members had to cross the entire country. This is the first meeting in five years that the association has held on the coast, the last being in San Francisco.

Those on the firing line, upon whose shoulders the real work of the association falls, must be given credit for a tremendous share of the success and growth of the association. Manager W. M. Kinney, Assistant Manager G. E. Warren and Director of Advertising and Publicity H. Colin Campbell and the rest helped to make this meeting a great success and the business was conducted in clocklike fashion.

Those present were:

REGISTRATION BY COMPANIES

ASH GROVE—J. F. Pollock, L. T. Sunderland.
ATLAS—E. D. Boyer, C. L. Johnson, D. H. MacFarland, Harold M. Scott.
BESSEMER—F. R. Kanengeiser, Charles Schmutz.
BEAVER—D. L. Carpenter, W. T. Muirhead.
BRITISH COLUMBIA—Edwin Tomlin.
CANADA—W. O. Bovard, H. L. Doble.
COLORADO—R. J. Morse, H. O. Warner.


GOSH- I'M HERE TO ADDRESS THE PORTLAND CEMENT CONVENTION BUT THE HALL IS AS EMPTY AS A CAKE-EATER'S HEAD - MAYBE THEY HAD TO HIRE A BIGGER HALL WHEN THEY FOUND OUT I WAS COMING —
CEMENT- THE FROM NOW-ON MATERIAL
HEY! WHERE ARE ALL THE PORTLAND CEMENT MEN? I THOUGHT THEY WERE HOLDING A CONVENTION HERE-
PORTLAND CEMENT CONVENT
TODAY ANDREW GUMP IN MAROON
THEY ADJOURNED AFTER A FIVE MINUTE SESSION TODAY- THE BOYS HAVE ALL GONE OUT TO VISIT HOLLYWOOD-
ALL GONE TO HOLLYWOOD- THAT'S THE KIND OF CEMENT MEN WHO MAKE WOODEN SIDEWALKS POPULAR- THEY THINK A CONVENTION IS A BASKET PICNIC- THEY ARE AS MUCH INTERESTED IN THIS CONVENTION AS A JELLY FISH IS IN REINFORCED CONCRETE - THEY'D SOONER SEE MARY PICKFORD THAN AN ORDER FOR A MILLION BBLS. OF CEMENT- THEY THINK CHARLEY CHAPLIN IS A GREATER MAN THAN CALVIN COOLIDGE- THE NEXT TIME THEY INVITE ME TO ADDRESS A PORTLAND CEMENT CONVENTION I'LL BRING ALONG A MOVING PICTURE CAMERA AND A BUNCH OF MACK SENNET BATHING BEAUTIES-
SIDNEY SMITH
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This was on the registration list and it explains why Andy's address is not included in this report

From left to right (men only)—S. W. Traylor, Norman Macbeth, Carroll A. Low, Blaine S. Smith, F. W. Kelley, W. M. Kinney, H. A. Schaffer, Ernest Ashton, E. D. Boyer, D. A. Abrams

DEWEY—F. E. Tyler, W. E. Tyler, F. L. Williamson.
DIXIE—George Kilian, Chester Padgett.
GOLDEN STATE—A. D. Jonckheere.
GREAT WESTERN—Page Golson.
HAWKEYE—C. B. Condon.
HELDERBERG—F. W. Kelley.
HURON—John W. Boardman.
INDIANA—Marshall Beck.
INTERNATIONAL CORP.—H. C. Koch.
KANSAS—H. C. Koch.
KNICKERBOCKER—H. C. Koch.
LEHIGH—Ernest Ashton, W. G. Perrow, B. H. Rader.
LAWRENCE—M. S. Ackerman.
MISSOURI—J. A. Coffey, B. G. Coyle, C. A. Horner.
MONOLITH—J. J. Calkins, E. R. Durfee, Wilmar Evans, T. R. Larson, Carroll A. Low, Harry E. Nelson, W. S. Trueblood.
NEBRASKA—R. J. Morse.
NEWAYGO—J. B. John.
NEW EGYPTIAN—S. W. Traylor.
OGDEN—R. E. Bristol, Harold C. Day, O. C. Hart.
OKLAHOMA—R. J. Morse, C. D. Nichols.
OLYMPIC—A. F. Krabbe, L. G. Pattullo.
OREGON—H. P. Davidson, David H. Leche, L. C. Newlands.
PACIFIC—W. G. Gilson, H. L. Groves, James A. Keller, Chas. Oliva, H. V. Towle, Theo. L. Walters.
PETOSKEY—J. B. John, John L. A. Galster, Sol Magnus, Henry Mosler.
PHOENIX—Lindley C. Morton.
RIVERSIDE—J. C. Allen, Ewald Anderson, Jess O. Bacon, L. C. Barton, Garner A. Beckett, W. J. Beman, C. L. Carman, W. S. Carmichael, C. D. Collom, Dudley Dexter, H. C. Dickson, Thos. Evans, S. Furze, F. W. Henshaw, Griffith Henshaw, Stanley Henshaw, Val Haresnape, W. H. Leonard, Norman Macbeth, Eaver MacDonald, J. R. Lippincott, Walter R. Miller, S. R. Mitchell, G. A. Witte, R. W. Prouty, H. M. Russell, John Treanor, Hubert Woods.
SAN ANTONIO—S. F. Barrera.
SANDUSKY—J. B. John, Geo. L. Brown, E. J. Maguire.
SANTA CRUZ—Lewellyn T. Bachman, Geo. R. Gay, W. G. Higgins, B. S. Johnson, George W. Nickel, Joseph Riordan.
SOUTHWESTERN—Rapier R. Coghlan, C. C. Merrill, H. E. Nichols, T. K. Partridge, F. H. Powell, L. V. Robinson, H. C. Swearingen, R. M. Willson.
SUPERIOR—James H. Kane, Jas. R. Stirrat, A. A. Sutherland, C. L. Wagner.
TEXAS—J. A. Wheeler.
THREE FORKS—R. J. Morse, J. D. Slemons.
UNIVERSAL—B. F. Affleck, Geo. S. Bartlett, Blaine S. Smith.
UNION—R. E. Bristol, R. J. Morse.
UNITED STATES—R. J. Morse.
UTAH—Ralph E. Bristol.
VULCANITE—Albert Moyer.
WOLVERINE—C. C. Jones.
WYANDOTTE—John W. Boardman.
ASSOCIATION—Duff A. Abrams, Fred T. Abram, Lee Boyle, H. Colin Campbell, B. D. Catherwood, S. A. Chapman, Chas. A. Clark, Lamar Cobb, A. P. Denton, G. S. Eaton, W. B. Elcock, C. D. Franks, H. M. Hadley, W. E. Hart, W. M. Kinney, H. G. Jacobsen, J. E. Jellick, J. W. Johnston, Forest Kaufman, W. F. Long, H. Mumm, Jr., C. N. Reitze, H. A. Schaffer, Mason J. Schlosser, R. H. Thomson, Jr., O. C. Tretten, G. E. Warren, R. W. Whitaker.

S. F. Barrera

S. F. BARRERA of the San Antonio Portland Cement Co., San Antonio, Texas, whose picture appears on a preceding page, has charge of the records of the plant machinery, keeps time of all the men and gives first aid to men injured. He has been with the company 12 years and is a brother-in-law of Charles Baumberger, president of the plant. He is proud of the fact that he is a direct descendant of one of the first 13 families that settled in San Antonio from the Canary Islands.

The plant has a daily output of 1600 bbl. and operates two 125-ft. kilns. The plant is being converted from the dry to the wet process and is installing one new 220-ft. kiln. The two old ones will be increased in length so that when completed the plant will contain three 220-ft. kilns. The plant runs day and night the year through. Its record of only 3.6 man-hours lost through accidents is therefore all the more astonishing.

Another Lime Plant in St. Genevieve, Mo.

LOCAL papers say that the site is being cleared off for the construction of a large lime plant at St. Genevieve, Mo., by the Bluff City Lime Co., which will be the fourth plant of the kind in the city.

Ask Protection Against Cement "Dumping"

PROTECTION of the local cement now being shipped into Los Angeles harbor duty free was asked in telegrams dispatched by the Chamber of Commerce of Los Angeles to President Coolidge, the Federal Trade Commission and California representatives in Congress. That an import duty be placed against these foreign cements which will equalize the difference in production cost between foreign countries now shipping in this cement duty free and production costs in the United States was asked in the telegrams.—*Los Angeles Times.*

Large imports of cement continue to cause concern among domestic manufacturers of that product. They are urging application by the Treasury Department of the anti-dumping act and will hold a conference on the subject with customs officials here on June 6.—*New York Commercial.*

Construction to Begin on New Cement Plant in Tulsa, Oklahoma

CONSTRUCTION is expected to start soon upon a $2,000,000 cement plant to be erected by the Boechter interests at Tulsa, Okla.

Company engineers have been looking over the ground for a location, to be within the switching limits of the city.

The plans and specifications for the plant call for the latest equipment. C. D. Nichols, district manager of the Boechter interests, has established headquarters in Tulsa and will oversee the development of the plant workings.—*United Press Service.*

Accident Prevention in Quarries

Safety Organization Outlined

By John F. Anderson
Hartford Accident and Indemnity Co., Hartford, Co.

THE PURPOSE of this article is to give a suggestion of the seriousness of the accident situation in stone or rock quarries so that a better appreciation of the true value of accident prevention activities as conducted by state labor bureaus and insurance companies may be had.

No one needs to be killed in an accident. Accidents are *caused*. They do not just happen. Eighty-five per cent of all accidental death can be eliminated through safety education.

Lack of sufficient education in the prevention of accidents results in many deaths per day; therefore, the man who aims to become a safety expert in all kinds of rock excavation should first learn the common causes of quarry accidents. If people can foresee, through education, what may happen, accidents will decrease in the industrial life of our country. I have not lost sight of the pity due accident victims, nor have I become hardened by experience, but my work has taught me that accidents occur most frequently through individual carelessness—carelessness of the moment.

Employes in quarries, shops and other work places will take chances. They take the same dangerous chances a thousand times with no serious result, but it takes only one time to become seriously injured or to be killed outright, and sooner or later the accident occurs. In every plant the objective is maximum production at minimum cost. Industrial accidents reduce production and increase cost.

Organization for Safety

It has been found that by organizing a standard safety and welfare organization among employes, the number of accidents has been reduced and the efficiency of the quarries increased. The safety organization should be divided into three branches of work: Supervising committee, inspection service, education of employes. The three principal requirements of such an organization are to supervise safety and welfare work, inspect in order to discover conditions that may cause accidents and educate the employes to live and work safely.

The first of these, supervision, is of little value unless inspection service is also carried on. The requirements for quarries and plans of different sizes are as follows: Class A, 1 to 150 employes; Class B, 151 to 500 employes; Class C, 501 employes or more.

The general committee should consist of not less than three persons, one of whom should be selected from the following: Manager, superintendent, engineer, master mechanic, foreman or other employe in position of authority.

There should be some competent person with knowledge of quarrying in full charge of the inspection service who should make regular weekly inspections of the quarry. Such person should fill out signed weekly reports showing the condition of the quarries and should recommend changes and improvements relative to working conditions.

Regular Inspections

The inspector should inspect for maintenance of safeguards, condition of hand and power tools, derricks, hoisting apparatus, cables, hoisting chains, engine and motor stops, signal equipment, and general condition of side and back walls, working bed and levels of quarries. He should also see that drawings and specifications for new machinery cover the guarding, in accordance with standards, of dangerous features such as gears, set screws, sprockets and couplings and should inspect new machinery before it is placed in operation and see that necessary guards are provided.

As education of employees is most important, serious thought should be given to it in order to obtain results. Suitably located bulletin boards should be provided for the posting of safety bulletins and safety orders, rules, warnings and information. There should be weekly meetings of the general committee and at least semi-annual meetings of employes, at which talks on safety should be given.

First-Aid Preparation

To be prepared for minor and serious accidents, a standard first-aid medical cabinet should be kept in the quarry and maintained by a person competent to administer first-aid treatment. A stretcher should also be kept with the first-aid cabinet in the quarry for use in case of a serious accident. At large quarries, it is recommended, and it is highly practicable, to have a dispensary building located as near the geographical center of the quarry as possible. The dispensary building, or room, should have at least 200 sq. ft. of floor surface, set apart from all workrooms, equipped with running hot and cold water and should contain the following equipment: Operating table; instruments and instrument case; couch and chairs; table and dressings; sterilizers for instruments and dressings; drugs, medicine, splints, dressings; basins, etc.; lighting facilities—complete.

A nurse who is either a graduate nurse or has had at least two years' practical experience, should devote his or her entire time to attendance at the quarry dispensary during working hours. A doctor licensed to practice medicine in the state having jurisdiction should be available to call at all working hours and should make at least semi-weekly visits to supervise the medical work.

Knowledge of the physical condition of employes at the time of hiring them, or shortly after, and the physical ability of employes to carry on the work which they are assigned to do is very important and should be given serious consideration by the quarry owner and operator. By having able quarrymen under proper supervision maximum production can be maintained.

Classification of Jobs

Employes and applicants for jobs should be classified in groups according to their physical fitness as follows: Group A—Normal in every way; Group B—Slight defects, none of which are severe; Group C—Severe defects; Group D—Unwise to hire.

The dangers of quarrying differ somewhat and depend on the size and depth of the quarry, and the character of the stone or rock being excavated. The common hazards, however, remain with the industry, and reports obtained from the Bureau of Mines show the accidents due to falling and rolling rocks, blasting and handling of explosives, in quarrying show no tendency to diminish, although they are largely due to causes which might be avoided. Many accidents are caused by rolling stones after blasting is done, and occur either on account of the use of wrong methods or because someone neglects to remove the loose rock from the top of the pile. Under ordinary circumstances, rain and frost have a highly dangerous effect on quarrying. After and during rains and when there is frost in the ground, the side and back walls should be inspected daily and trimmed in order to release any loose rock that may be insecurely held in place.

Protective Equipment

In deep quarries it is very good practice for employes to wear some head protection, such as steel trench helmets or compressed fibre caps. The blasting operations should be entrusted to a most capable man and only standard practices should be allowed. Employes should be given specific instructions relative to blasting warnings, and foremen and superintendents should exercise severe discipline among employes relative to getting under cover when blasting operations are in order. Such covers should either be natural caves in the walls of quarries or shelters, or constructed of timber or cement. Explosives should be handled with extreme care and only a daily supply allowed in the quarry and stored in the side of back wall, protected with a frame door which should be kept locked except when in actual use.

In closing this article, I appeal to you for your co-operation in reducing this enormous annual waste; not by words, but by deeds of carefulness.

Missouri's "Twenty-Cent Sand"

By EDMUND SHAW
Editor, Rock Products

THE accompanying photograph shows the pile of Missouri's famous "twenty-cent sand" as it appeared on May 16. Measurements of the pile were not made but by pacing and roughly estimating the cross section it was judged that the pile might contain 10,000 tons, perhaps more.

The sand is free from clay and is well graded in some parts. Other parts showed lumps of fine sand and some silt. The pile was not sampled but eye inspection would justify the prediction that the sand which shows on the surface would meet the *grading* requirements of the Missouri state highway specifications.

The surface of the pile is clean in some places and in others it is littered over with sticks and coarse pieces of lignite. The pile was dug into at a few places and more sticks and large pieces of lignite were found. As one who is somewhat familiar with such matters, the writer would say definitely that the sand should not be used as concrete fine aggregate until these sticks and at least the coarser pieces of lignite were removed. And he does not believe the highway engineer or any of his inspectors would accept the sand as it lies from any regular producer.

Chief Highway Engineer Piepmeier requested that Rock Products have this sand investigated by one of its editors and the above is the result of such investigation.

But Rock Products has never questioned the quality of the sand. It has only questioned the accuracy of the statement that the state of Missouri was buying sand for concrete highways, which would meet the state's own specifications, at 20 cents a ton. And it still questions it.

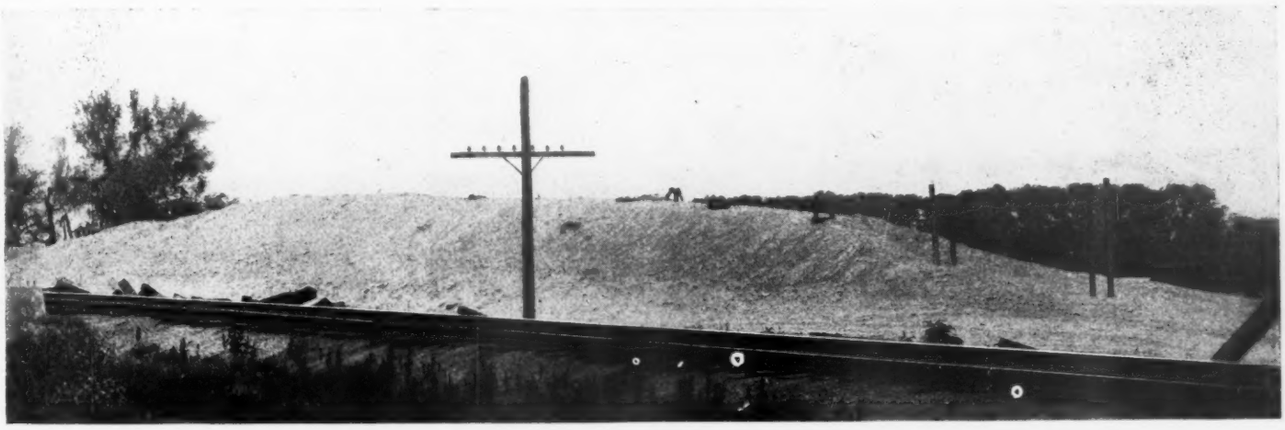
It does not question that the sand as it lies in the pile cost 20 cents a ton. But when one gets a price on sand he gets it for the sand loaded on cars. And he also gets a price for washed and screened sand which he may compare with corresponding prices from other producers. It is this sort of a price which Rock Products publishes in its market reports and it is this sort of price that any customer would be quoted if he went to a sand plant and asked the price of sand at the plant.

Any other price than one which can be compared with the prices of other sands is an absurdity. There are probably places in Arizona where the state highway commission of Missouri could get all the sand it wanted for nothing, but by the time it had paid for loading it on cars and bringing it to Missouri it would not say that the sand cost $0.00 a ton. Yet this is hardly more absurd than the 20-cent statement.

Mr. Piepmeier informs the writer that the sand can be loaded for another 20 cents a ton, and this seems reasonable. Information from a reliable source is to the effect that the state is building a spur to the sand pile for which the Federal government is furnishing the rails. The Federal government is also lending the state a locomotive crane for loading the sand. But unless the railroad is also ready to make a donation of the cost of transportation, or a part of it, there is still something that must be added to find the real cost of the "twenty-cent sand" to the state. It is the f.o.b. destination price that really counts.

Since the matter of freight rates is so important, Rock Products has gone into the matter rather thoroughly and has had a table prepared by a traffic specialist who is familiar with shipments of sand and rates around Kansas City. The territory covered by the calculations includes the following counties: Jackson, Lafayette, Cass, Bates, Vernon, St. Clair, Barton, Clay, Ray, Carroll, Platte, Clinton, Caldwell, Livingstone, De Kalb, Daviess, Chariton and Pettis (which are all that are in the territory that would naturally be supplied from Kansas City), an average rate being taken for each of these. These average rates have been multiplied by tons of sand shipped for highway purposes to give a "weighted average." And in this manner the weighted average has been calculated for (1) the freight from Kaw Point or Quindaro, where the pile of "twenty-cent sand" lies; (2) the freight from Kansas City, and (3) from the point in the district enjoying the lowest rate.

This table shows that the weighted average freight rate from Kaw Point (1) is $1.11 per ton; from Kansas City (2) it is $0.917 per ton, and from the point enjoying the lowest rate (3) it is $0.809 per ton.



The sand which the state of Missouri bought for 20 cents a ton—not on the car but as it lies here. A spur has to be built to the pile and the sand should be cleaned from sticks and trash to be fit for use

Since sand for highway purposes can be bought at the point enjoying the lowest freight rate, the differential of $0.301 should be added to obtain the real cost of the "twenty-cent sand." We have then:

Paid Wood Bros. for pumping on the bank	$0.20
Cost of loading, Mr. Piepmeier's estimate	0.20
Freight differential	0.30
	$0.70

On contracts of any respectable tonnage the state of Missouri can buy all the sand it wants for highway purposes from regular producers in Kansas City at 70 cents a ton.

Note that nothing has been added for the cost of removing the sticks and big pieces of lignite, although this should be done before the sand is fit for concrete fine aggregate. Neither has anything been added for grading, ties, track-laying and the other expenses connected with building the spur.

The net gain to the state then is absolutely nothing. And for this it has done a great industry an incalculable harm by broadcasting the ridiculous and absurd story of buying sand for 20 cents a ton.

The Quarry Properties in Which the State of Missouri Has Invested Public Money

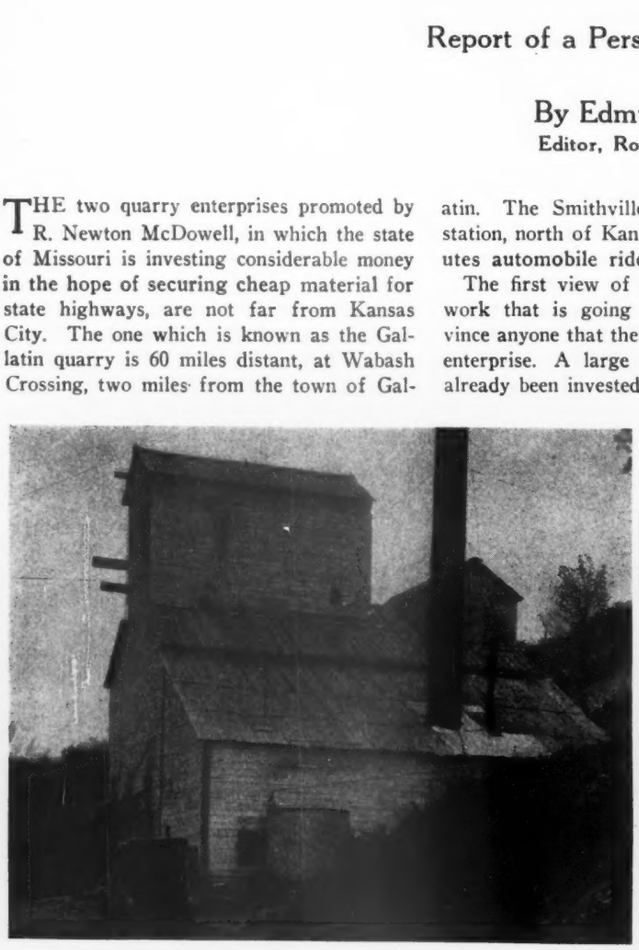
Report of a Personal Investigation

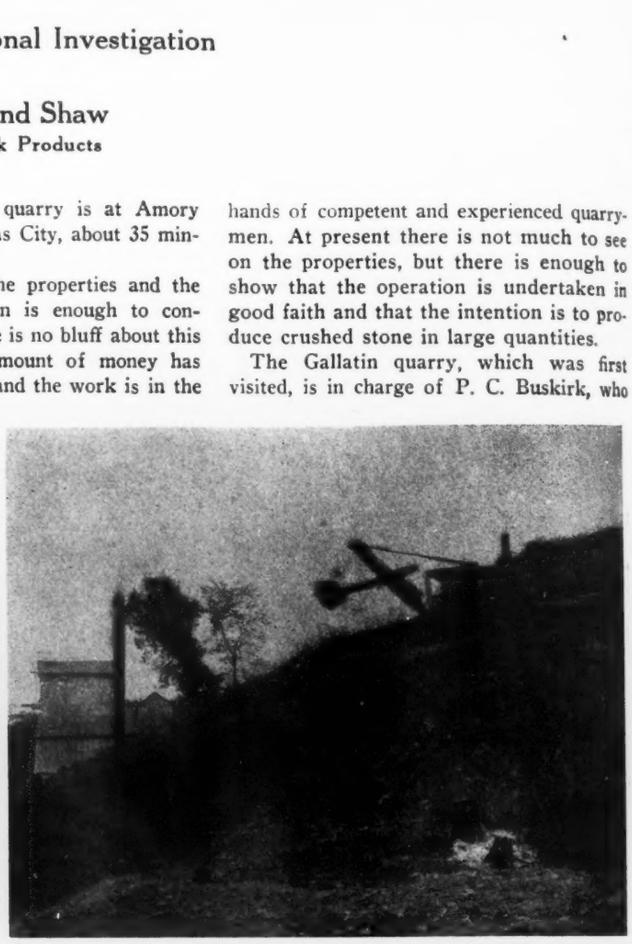
By Edmund Shaw
Editor, Rock Products

THE two quarry enterprises promoted by R. Newton McDowell, in which the state of Missouri is investing considerable money in the hope of securing cheap material for state highways, are not far from Kansas City. The one which is known as the Gallatin quarry is 60 miles distant, at Wabash Crossing, two miles from the town of Gallatin. The Smithville quarry is at Amory station, north of Kansas City, about 35 minutes automobile ride.

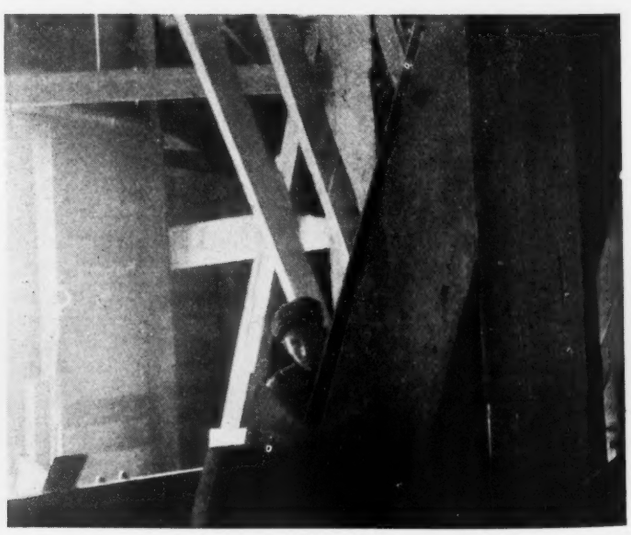
The first view of the properties and the work that is going on is enough to convince anyone that there is no bluff about this enterprise. A large amount of money has already been invested and the work is in the hands of competent and experienced quarrymen. At present there is not much to see on the properties, but there is enough to show that the operation is undertaken in good faith and that the intention is to produce crushed stone in large quantities.

The Gallatin quarry, which was first visited, is in charge of P. C. Buskirk, who





Gallatin: Left—The old plant which has been remodeled and rebuilt. Right—Steam shovel stripping top of lower ledge



Gallatin: Left—Carpenter shop and office; men building new quarry cars. Right—Putting buckets on main elevator of the plant

has had charge of various quarries in and around Kansas City and hence is familiar with the problems of this district. This property was formerly known as the Earnshaw quarry and was worked for a short time for both commercial crushed stone and railway ballast. A face is exposed for a length of 200 to 300 ft., and there is an old plant which has been remodeled and rebuilt. The power plant and the original crushers have been retained but reinstalled on new foundations and the remainder of the plant is new. There is a No. 8 and a No. 5 Gates crusher, both of which discharge to a 30-in. belt elevator which takes the crusher products to a screen at the top of the plant, following a very common design. The elevator was being installed at the time of the writer's visit but the screen had not been received. It is intended to supplement the work of the scalping screen with a shaker screen to make the finer sizes. The bins have been rebuilt and new timber shows everywhere except on the outside of the building so that the plant is a new plant to all intents and purposes.

A force of men was working on the plant and another force was engaged in building cars, utilizing the irons from the old quarry cars. A steam shovel and a number of teams were engaged in stripping the ledge below the old workings, from which it is expected the greater part of the production will come.

The old workings are in the Winterset ledge. Below this is the Bethany Falls ledge which was worked before, but the workings were afterwards filled in. This information was given by Mr. Buskirk and it checks with the geological section as given in one of the state reports. The Bethany Falls ledge is nowhere exposed to any extent but from the record of previous workings it has a depth of 16 ft. at this quarry and it is this ledge which is to be depended upon for highway material, since it is only from the Bethany Falls ledge that quarries in and around Kansas City can make material which will meet all the specifications for highway material. The Winterset ledge above is worked for concrete aggregate and railroad ballast in the Kansas City quarries, but there is a lot of shale, shelly rock, etc., that has to be sorted out to make a good aggregate from it.

So far as the writer was able to learn, no core drilling or other form of prospecting has been done on this ledge, although the Bethany Falls ledge below the Winterset has been exposed at one point.

Work has been pushed to get this quarry and plant into early production. Mr. Buskirk says that a contract has been let with a company operating a dragline nearby to strip the face of the quarry along the Bethany Falls ledge and to sidecast the strippings on low ground across the road.

Smithville: Left—Steam shovel excavating for foundations of the primary crusher. Right—The new grade for side track

Smithville: Left—Teams working on the plant site. Right—face of cut where railroad passes through a part of the ledge

A section of the formation at Gallatin as given by the Missouri state geological survey is as follows:

SECTION NEAR GALLATIN*

No.	Stratum	Thickness Ft.	In.
1	Limestone, gray, fossiliferous; weathered shelly along the crest of ridge	6	..
2	Limestone, gray, fossiliferous; rather thinly-bedded; showing occasional small nodules of black chert	3	6
3	Shale slope	2	..
4	Limestone, gray, irregularly bedded; fossiliferous; showing numerous specks and irregular markings of calcite	8	..
5	Shale, dark, bluish	1	3
6	Shale, black	1	6
7	Shale, slope	5	..
8	Limestone, gray; nodules of disintegrated limestone	5	..
9	Limestone, gray; weathered to buff along joints; upper portion somewhat mottled (Bethany Falls)	9	6
10	Shale	..	2
11	Limestone	..	5
12	Shale, bluish-gray	..	6
13	Limestone	..	8
14	Shale, lower portion black; carbonaceous; upper portion gray to buff	4	6
15	Limestone, gray, heavy bed, fossiliferous	1	2
16	Shale	3	..

Numbers 14-16 are included in the Ladore shale; 8-13 in the Bethany Falls limestone; 5-7 in the Galesburg shale, and 1-4 in the Winterset limestone.

*Buehler, H. A., Lime and cement resources of Missouri; Missouri Bureau of Geology and Mines, vol. 6, 2nd series, pp. 125-126, 1907.

Smithville Quarry Property

At Smithville the operations are in charge of W. J. Brimacombe, who was formerly with the Brownell Improvement Co. and was in charge of a large plant and quarry in Little Rock, Ark., before that.

Work at Smithville is being confined to two places, the railroad grade for a siding, which will be needed for the delivery of machinery and equipment, and the site of the primary crushing plant where a steam shovel is excavating for the foundations of the primary crusher. The only buildings up are an office building and a pump house. Mr. Brimacombe says that he is confident that the plant will be in steady production before the end of the year, and he is pushing the work along at a rate that shows he has some chance of acomplishing this.

The plant is to be in three units connected by belt conveyors. The primary crushing plant will contain a No. 36 McCully gyratory. The product will go from this unit to a second building in which are the reduction crushers and screens, and from this by a belt conveyor to a third building in which the finishing screens and loading bins are to be placed. The design is by the Power and Mining Machinery Co., recently taken over by the Allis-Chalmers Manufacturing Co., with whom, according to Mr. McDowell, the orders for all the machinery have been placed. It will be a thoroughly modern large-tonnage crushing plant.

Regarding the nature of the deposit, little could be learned. The state highway commission was moving a core drill to the location at the time of the writer's visit so that accurate information may be had. But up to this time the only prospecting of the ledge was by means of a well sunk many years ago near a house which shows in the accompanying illustrations. This well passes through both limestone and shale. Definite information as to the thickness of the strata could not be obtained. Mr. Brimacombe estimated that a face 40 ft. high would be worked, including the limestone ledges and the shale partings.

The geological section near Smithville as given in a Missouri state geological report is as follows:

TYPICAL SECTION OF UPPER HALF OF THE LANSING FORMATION IN EASTERN PLATTE AND CLAY COUNTIES

No.	Stratum	Thickness Ft.	In.
1	Limestone, gray; in thin layers (No. 115)	..	4
2	Limestone, gray; in one bed (No. 115)	1	..
3	Shale, gray (No. 115)	..	7
4	Limestone, blue, argillaceous (No. 115)	..	9
5	Shale, greenish and sandy above; argillaceous below (No. 114)	6	8
6	Limestone, buff (No. 113)	2	..
7	Limestone, gray; thin bedded; with buff, shaly partings (No. 112)	13	..
8	Shale; slaty in lower half (No. 111)	5	..
9	Limestone, blue; even-bedded; in four or more layers (No. 110—base of Stanton limestone)	3	..
10	Shale, blue, sandy (No. 109—Vilas shale)	4	6
11	Limestone, banded gray; in thin wavy beds; weathering buff and sandy (top of Plattsburg)	1	4
12	Shale, buff; with layers and nodules of limestone	2	7
13	Limestone, nodular	..	4-5
14	Shale, buff	..	8
15	Limestone, bluish-gray	2	6
16	Shale	..	1
17	Limestone, bluish-gray	6	6
18	Shale	..	2
19	Limestone, bluish-gray	1	8
20	Shale, blue	..	8
21	Limestone, buff, cellular	..	9
22	Limestone, gray	..	6
23	Shale, dark blue, almost black	1	..
24	Shale; with layers and nodules of limestone	1	4
25	Limestone, blue (base of Plattsburg)	4	4

Page 158. Missouri Bureau of Geology and Mines. Vol. XIII, 2nd Series, H. A. Buehler, "The Stratigraphy of the Pennsylvanian Series in Missouri."

According to Mr. Regal, chief highway inspector, who has charge of testing road materials, the proposed quarry lies in the Plattsburg formation, which is shown in this section by the numbers, 11 to 25 inclusive.

The railroad which passes by the quarry site at Smithville lies in a cut about 1000 ft. below the plant. The face of the cut is so covered with dirt and debris that no information can be gained from this exposure.

Monmouth Stone Co. Goes into Bankruptcy

THE Monmouth Stone Co. has filed a petition in bankruptcy in the federal court of Peoria. The total liabilities were not made public, but it is said they would probably amount to close to half a million dollars. The assets consist of the plant at Gladstone. The actual worth of the machinery in the plant is said to be greater than the total liabilities.—*Astoria (Ill.) Argus.*

About 150 stockholders of the Monmouth Stone Co. were in Galesburg recently to determine the financial policy of the concern during the next 12 months. The company was declared bankrupt recently and an effort is being made now to give stock and bondholders an opportunity to realize something on the funds invested in the defunct company. The meeting here was held in the offices of Attorney Wilfred Arnold, who represents the local interests.

The Standard Trust and Savings bank of Chicago, which holds the 8% first mortgage gold bonds on which interest payments have been defaulted for the last four times, is represented by Attorney Johnson of Chicago, who also represents the bondholders' protective committee.

Executives of the stone company are reported to have admitted that the stock is practically worthless. The bonds are in better condition and the bondholders have a good chance to get most of their money back in case the company should be dissolved.

It is stated that a plan is on foot to reorganize the company on a firmer financial footing. Operations at the plant have been almost at a standstill during the last month. —*Galesburg (Ill.) Republican.*

Ohio's State Quarry

STATE stone quarry on the land of the Columbus State hospital is prepared to furnish from 10 to 15 carloads of crushed stone a day to the state highway department for use in road construction, J. E. Clark, superintendent of the state manufacturing and sales division, has reported.

The state gets most of the contracts for materials from the state nearby but in remote parts of the state, the freight rates often keep Clark's division from being low bidder.

Fifty convicts are now working at the quarry and 200 will be placed there in early summer when the new dormitory, now building is completed.—*Columbus (Ohio) Citizen.*

Alabama Cement Plant Will Double Capacity if It Can Get Power

ADDITIONAL power is greatly needed for the operation of the Gulf States Portland Cement Co.'s plant at Demopolis, according to Henry McDaniel of Marengo county. He states that an extension of the lines of the Alabama Power Co. to Demopolis is desired by business interests there.

Mr. McDaniel was recently elected secretary-treasurer of the Gulf States Portland Cement Co., succeeding C. M. Parker, resigned. He represented Marengo county in the 1923 legislature. The Demopolis cement plant is producing 1200 bbl. of cement a day, Mr. McDaniel states, and is prepared to double its capacity when power can be obtained. He states that the plant consumes more power than the entire city of Selma.

According to Mr. McDaniel, gypsum is the only ingredient which has to be imported at Demopolis to produce cement. Limestone, sand and clay are immediately available.—*Montgomery (Ala.) Journal.*

Kansas and Missouri Cement Plants

KANSAS and Missouri have 12 active portland cement mills, which in 1922 produced 10,804,920 bbl. of portland cement, according to the latest figures for the cement industry compiled by the United States Geological Survey. The output of portland cement mills in the two states was considerably increased in 1923. Government figures for the year, however, have not yet been made public.

More Missouri Asphalt Is Found

JOHN STORTZ, who has been drilling for D. V. Snowgoose and associates on the Steinbaugh place about seven miles southwest of Nevada, Mo., reports the drill passed through 28 ft. of asphalt and two 4 ft. veins of coal. This strike means Vernon county asphalt can be mined cheaper than any asphalt in the United States, on account of having the necessary fuel on the ground.—*Nevada (Mo.) Mail.*

Consumption of Cement in Canada

THE Canadian Cement Co. of Montreal, Canada, calls ROCK PRODUCTS attention to figures of cement sales in Canada which were sent in by a Canadian correspondent of this paper and published in the "News of All the Industry" section of May 17. It seems that the figures of 2,660,985 bbl. sold in 1922 and 3,173,993 bbl. sold in 1923 are misleading unless accompanied by the information that increased sales did not signify increased consumption but only sales to a foreign market which had to be made at a sacrifice. The letter goes on to say:

Information of this kind is, to say the least, misleading. An effort is made in this propaganda to show that the consumption of cement in this district is rapidly increasing, whereas actually the consumption is less at the present time than it was 10 to 12 years ago. The Province of Quebec has a producing capacity of 5,000,000 bbl. per year and a consumption at the present time of 2,000,000 bbl. per year. You will note in the attached clipping they use the word "sale" instead of "consumption."

It is true an effort has been made in the last few years to get rid of some of the surplus production in Quebec province by shipping cement to foreign markets, and anybody who knows anything about the conditions under which cement must be sold in foreign markets today will readily appreciate what sacrifices have to be made to sell it.

The actual number of barrels consumed in Quebec province in 1923 was less than was consumed in 1913; in other words, we are not yet back to pre-war consumption.

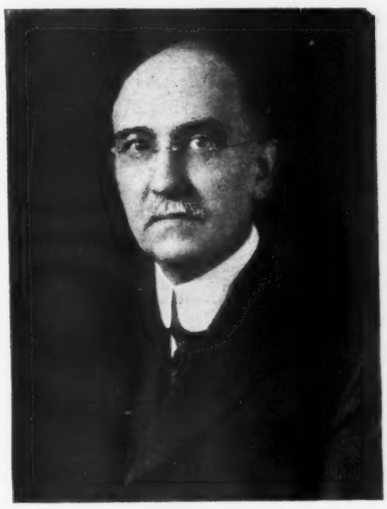
With these facts before you, you will understand the cunningness with which the figures quoted in the clipping have been used.

CANADA CEMENT CO., LTD.
J. D. JOHNSON,
General Sales Manager.

Death of Frank C. Caldwell

FRANK C. CALDWELL, a director of the Link-Belt Co. since the purchase of the H. W. Caldwell and Son Co. by the Link-Belt Co. in 1921, was stricken with heart failure the morning of May 15 while on his way to his bank. He died in an ambulance en route to a hospital.

Mr. Caldwell was born in Indianapolis in 1866, and came to Chicago in the early 80's to compete his education at Union College of Law. He practiced until 1892 when he



Frank C. Caldwell

became vice-president of the H. W. Caldwell and Son Co. He became president in 1908 and continued until the Caldwell company was purchased by the Link-Belt Co. in 1921.

Since then he has been a director of the Link-Belt Co. His long experience in manufacturing, his knowledge of law, his ability and his sound judgment were held in high esteem by all who knew him.

New Sweetwater, Texas, Gypsum Plant Begins Production

THE Sheetrock wallboard mill, the final unit of the $1,000,000 plant of the United States Gypsum Co. at Sweetwater, Texas, went into operation May 20. This is the fifteenth plaster mill operated by this company. The new plant includes, besides the wallboard mill, power plant, rock crusher, pulverizing, calcining and mixing plant and extensive storage and trackage facilities.

Receivership Lifted from American Gypsum Company

THE receivership upon the properties of the Nobles Gypsum Co. and American Gypsum Co. has been lifted by order of the United States district court.

The result was brought about by the fact that a controlling interest in the companies was acquired by the Universal Gypsum Co. of Chicago.

Crushing Plant Announced for Upland, Calif.

ANNOUNCEMENT has been made that J. J. Ford of Claremont will establish at 16th street and Wilson avenue, Upland, Calif., a rock-crushing plant at a cost of from $200,000 to $250,000.

Mr. Ford has just purchased a tract of 63 acres from the Euclid Water Co. The crushing plant is to be equipped with the latest type machinery.

The Pacific Electric will run a spur track north from the Randolph packing house to the site of the proposed rock-crushing plant, the survey having already been completed, it is said. The actual laying of the tracks is expected to start in the immediate future. —*San Bernardino (Calif.) Sun.*

Denver Gravel Producer Increases Holdings

ACCORDING to the *Denver (Colo.) Post,* announcement has been made by J. W. Brannan, of the purchase of 15 acres of land from the Crawford Hill estate. The land lies north of the Platte river, off 31st street in Denver, and was obtained for a consideration of $17,000. Its acquisition gives Brannan a total of over 107 acres of gravel property, costing approximately $100,000.

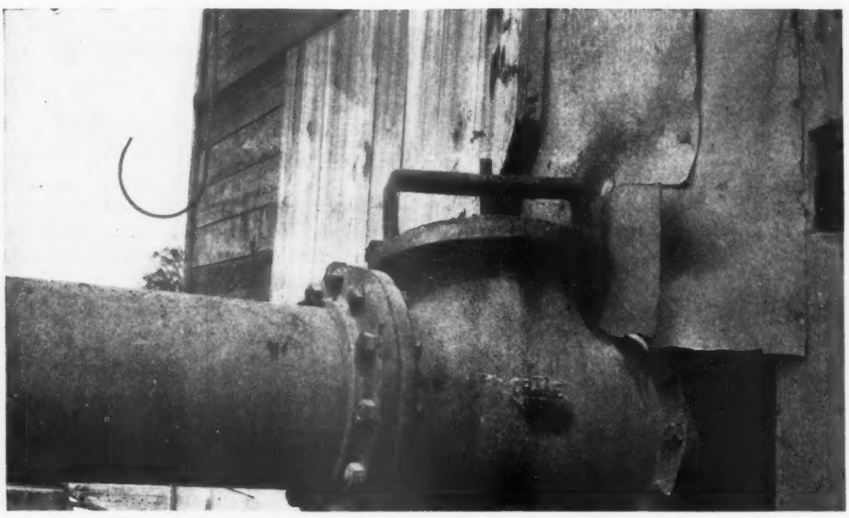
Gravel property has been a troublesome proposition with Denver contractors for many years. The deposits near the city are plentiful, but the best of them have usually been tied up in such a manner that they could not be used. Brannan, who has been in the gravel business for more than 35 years, for many months has been devoting his time and funds to acquiring properties which will give him ample supplies for the next several years.

He lately concluded the purchase of 30 acres of land from the Wolcott estate lying just north of Overland park. The price was said to be in excess of $15,000. In addition, he acquired 16 acres at Cherry Creek and Colorado boulevard, through the Colorado National Bank, for a consideration of $8000. These are his latest ventures.

Growing Use of Dolomite

THE question whether dolomite was a favorable material for the bottoms of electric furnaces was discussed by a few of those present and the interesting testimony was brought out that at one plant dolomite had been used as a substitute for magnesia for five years in electric furnaces and large numbers of heats had been made upon such bottoms. Another user cited the lower cost of dolomite and recommended its use, provided the material was not purchased far ahead of its actual placing in the furnace. He also stated that in his own experience many hundreds of heats had been made on dolomite bottoms in electric furnaces.—*Iron Age.*

Hints and Helps for Superintendents



Valve that prevents pump from bursting

A Valve That Keeps a Pump from Bursting

WHY a centrifugal pump, pumping sand, should burst in the course of ordinary operations is something of a mystery, but a 12-in. pump on the dredge of the Wolf River Sand Co. has burst twice with explosive violence, and the same thing would have happened numerous other times if it had not been for the valve shown in the accompanying picture.

The pit that is being dredged has a clay bottom, and it is supposed that when the break occurred the suction had been let down into the clay far enough so that clay got into the pipe and formed a plug. Then the plug hung in the pipe for a little while and finally shot up into the pump with a shock of such violence that the pump was cracked. The pressure of the water in the line and the rotating impeller did the rest of the damage.

After the second explosion, V. A. Cordes, the president of the company, designed a relief valve which is placed in the suction pipe near the pump. On several occasions since the last burst the valve has been lifted by pressure in the pipe and the relief was sufficient to keep the pump from bursting.

The valve is made from a 12-in. tee, a face being formed on the flange not connected to the pipe. The valve plate is of cast iron about 1 in. thick and machined to make a good fit on the flange face. A simple yoke of strap iron with a hole in the center, and a rod attached to the valve plate which passes through the hole, keeps the plate from flying off too far when it is lifted by the pressure.

No springs are needed to hold the valve closed. As it is on the suction pipe the pressure of the atmosphere is sufficient to hold it firmly against the seat. The suction in this pipe is turned to pressure whenever a shock such as would burst the pump occurs.

Mr. Cordes in investigating the cause of bursting of the pump found that such an occurrence was rare, although there were records of pumps on government dredges which had burst in the same way.

The plant of the Wolf River Sand Co. is situated a short distance from Memphis, Tenn. It operates both a suction dredge and a dragline cableway excavator.

Converting a Tractor to a Locomotive

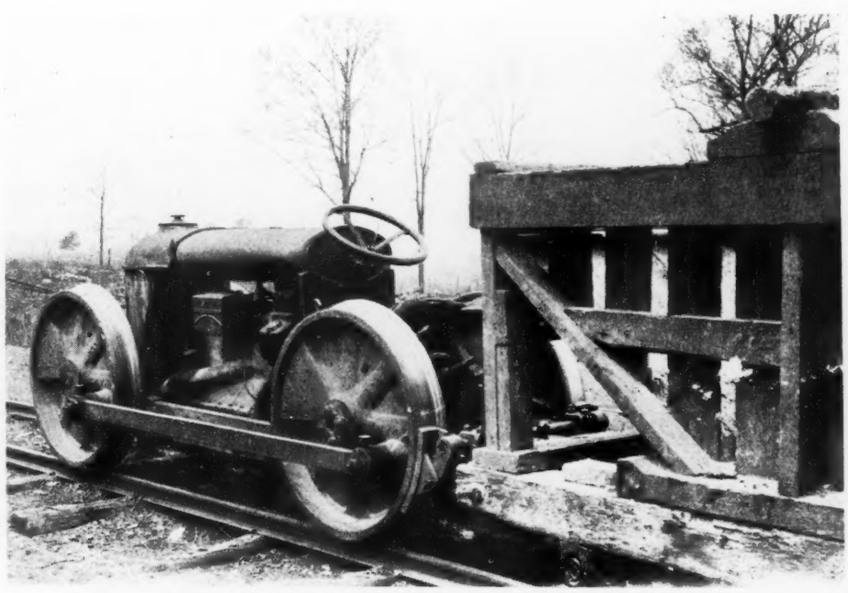
A FORDSON tractor has not sufficient power to haul long trains such as are used in large quarry operations, but it is a very efficient machine to take the place of mules or hand tramming in a small operation.

The machine shown here is in use at the O'Neal Lime Works, at Eureka, Ala. It hauls all the stone needed to keep the three small kilns in operation (the production being 500 lb. of burned lime per day) and does it quite easily. The track is ¾ mile long. It has proven itself a very reliable machine having been in service for a long time without needing more than the ordinary repairs and it has given no trouble. Gasoline is used as fuel. It will run well on kerosene but seems to have more power when fed with "gas."

The conversion was made at a machine shop in Birmingham. All that was done was to take off the tractor wheels and shafts and replace them with ordinary car wheels set at the track gage. The wheels on each side were connected with side rods.

An ordinary laborer was easily taught to drive the machine.

The car shown attached to the locomotive is of a type used in the smaller quarries in the Southeast. The bed and sides are made of hard wood and all the construction was completed at the plant by the plant carpenter. A number of these cars are in use at the O'Neal plant.



Tractor converted to a small quarry locomotive by putting on railroad wheels and connecting them with side rods

A Good Blasting Signal

THE bell shown in the accompanying picture is rung by closing a switch at the quarry of the Ladd Lime and Stone Co., near Cartersville, Ga. It is a part of the duty of the quarry foreman, or whoever is in charge of the quarry when a shot is to be fired, to see that this switch is closed a sufficient length of time before firing to allow cars and horse drawn vehicles to get well out of danger.

The road shown is parallel to the face of the quarry and there are two of these signals at either end of what might be considered the danger zone. In this way a car approaching is warned not to enter the danger zone if a blast is about to be fired.

It is common for quarry operators to post signs, "Danger, blasting going on," and the like on parts of the road on which a stray stone from a blast may light. But such signs do not tell whether the danger is immediate or not. With the bell signal the driver knows he is quite safe to go on if the bell is not ringing, and if the bell is ringing he knows he is taking a risk if he drives through the danger zone.

It should be added that the road so protected is so far from the quarry that the danger of a flying stone falling upon it is practically negligible. However, as every quarryman knows, an occasional blast will throw a stone almost as though it was shot from a cannon and it is to prevent any damage from such an unusual occurrence that the road is posted.

Good blasting signal

Aerial carrier for quarry work

An Aerial Carrier for Quarry Work

AT the quarry of the Pine Mountain Granite Co., near Atlanta, Ga., the stone is quarried above the plant and the railroad track and some rough ground intervenes over which it would be very expensive to lay a railroad track. The blocks of quarried stone and boxes of spalls that are used as feed for the crushing plant are sent down by means of aerial tramways which were designed and built by Mr. Hasslett, the superintendent of the quarry.

These tramways work over a single span, the cable being supported at each end on masts which are well guyed. As the transportation is down hill, gravity does the work and a single line is all that is needed from the hoist.

A stop, the position of which may be changed from the ground, holds the carrier frame in place so that a pull on the line hoists the weight. The pulley is then locked so that the weight cannot be lowered and the carrier frame runs down to the lower point, controlled by the brake or the drum of the hoist. At the lower point it is stopped and the weight lowered by the hoist. The hoist then brings the carrier frame back to the loading position.

Three of these tramways are in use at this quarry.

Crusher Foundations

THE first essential to a crusher is a firm foundation. Where possible it is advisable to have a concrete foundation perfectly rigid and steady, and consequently the concrete block should be on a solid base.

To build a concrete block on a loose and unsuitable bottom of earth is asking for trouble. There are crushers fixed on concrete blocks which sway alarmingly when the machine is running.

It is not only necessary to get down on to a bed of good composition to insure a safe foundation. One case came under the writer's notice where the concrete foundation for a large crusher was certainly put on the solid rock, but it was on a hillside where the lie of the stone sloped at an angle of about 30 deg. in same direction as hillside. Insufficient anchorage for the concrete block was not provided for, and some little time after the crusher started to work the concrete block began to travel down hill.

Another case came under my notice once where the concrete block of a crusher foundation formed the side of an elevator pit, which is often the case. A river ran 40 to 50 yd. away, and before the concrete work was set the water began to find its way through into the elevator pit, due to the river being filled by the recent rains. The means adopted to try to stop the water was to plaster concrete on to the walls and floor of pit until a lining of about a foot thick all around was put on. Now elevator pits are a great worry to quarry managers, the first cost in excavation being greatly grudged. In consequence, the pit is kept down as small as possible. Thus, in this particular case, when dimensions of the pit were reduced about 12 in. in every direction, the pit became very small and cramped.

A rather similar case to the one I have just cited, in which the quantity of water was very much greater, was treated in a more scientific manner. A stream, which ran close by, actually broke through into the excavation. The side of the pit was shuttered to keep out the main volume of water, and the excavation was taken out about 3 ft. larger on each side than the dimensions called for by the concrete work. This 3 ft. all round was taken out 2 or 3 ft. deeper than what was considered a safe and solid bottom, and into this trench the water that got through was allowed to collect, and a centrifugal pump was put to work which was able to keep the water from rising to an extent that would have been injurious to the concrete work.—*Stone Trades Journal.*

New Railroad Rock Crusher at Brownwood, Texas

WORK on the great rock crushing enterprise of the Gulf, Colorado & Santa Fe Railroad Co. at Brownwood, Texas, is making good progress. The bins are erected and the conveyor structure is being completed. The right-of-way was blasted through solid rock a considerable distance along the side of Hall mountain.

The bin is divided into several compartments. Rocks of various sizes are placed in the compartments, from which they are released by pulling a lever, into the open cars on the track below. Endless chain conveyors will carry the rock from the crusher further back on the hill to the bin.

Workmen are working on the shed, which will house the conveyors. The main bin structure is 50 ft. in height. The rock crusher will have a daily crushing capacity of 1200 cu. yd.—*Dallas News.*

Quarry Company Must Pay $10,000 for a Damaged Foot

A $10,000 damage verdict against the Consolidated Marble and Stone Co. of Carthage, Mo., was returned by a jury in division No. 1 of circuit court at Joplin in favor of O. H. Raine.

Raine asked $15,000 damages for a mangled foot and the loss of three toes received in an accident at the quarry when a channeler engine ran over his foot while he was attempting to stop it by working an alleged defective lever. Raine also alleged that he was inexperienced in operating a channeler and that the defendant company or its agents were aware of this fact when they transferred him from other work.—*Carthage (Mo.) Press.*

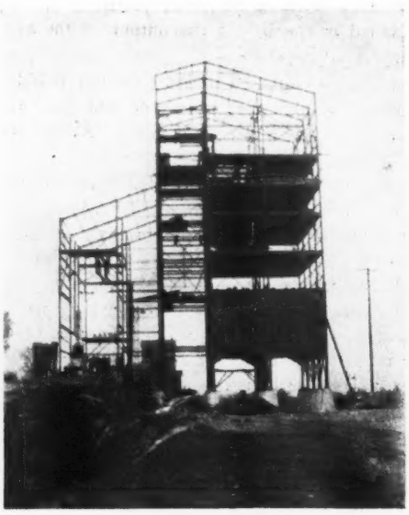
Phosphate Rock Mined and Shipped in 1923

PRELIMINARY figures from the Department of the Interior, compiled by the Geological Survey, show that 2,998,500 long tons of phosphate rock, valued at $11,396,900, was shipped from mines in the United States in 1923. Florida, the leading state, shipped 2,555,400 tons, worth $8,984,800, more than nine-tenths of which was land-pebble phosphate. Shipments from Tennessee and small amounts from Kentucky were 437,900 tons, worth $2,387,100. Idaho and Wyoming made small shipments.

The phosphate rock mined in the United States in 1923 amounted to 2,857,700 long tons, which is 22% more than that mined in 1922. More than four-fifths of it was mined in Florida. Most of the remainder was mined in Tennessee and Kentucky, though a small quantity was mined in Idaho and Wyoming.

New Plant of Mid West Crushed Stone Quarries

A DESCRIPTION of the improvements that are being made by the Mid West Crushed Stone Quarries at Greencastle, Ind., was given in ROCK PRODUCTS for February 23. The picture shows the steel frame of the new plant as it appears today under construction.

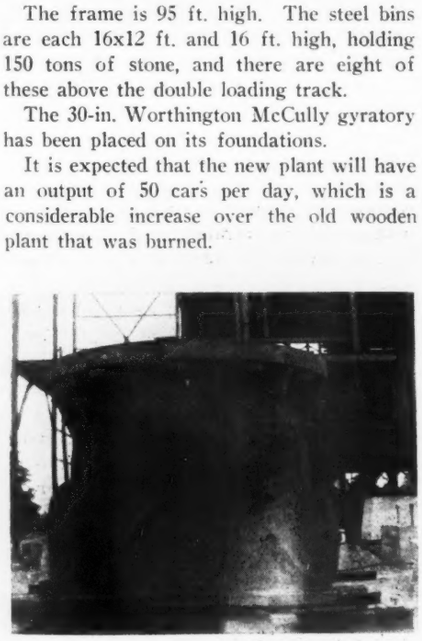


Steel frame and steel bins of the new Mid West Quarries plant

The frame is 95 ft. high. The steel bins are each 16x12 ft. and 16 ft. high, holding 150 tons of stone, and there are eight of these above the double loading track.

The 30-in. Worthington McCully gyratory has been placed on its foundations.

It is expected that the new plant will have an output of 50 cars per day, which is a considerable increase over the old wooden plant that was burned.



The 30-in. primary crusher which has been placed on its foundations

The screening system of this plant is of interest since it is a departure from the conventional system. It uses hexagon rotary screens and suspended "knocker" screens, all the details of the system having been worked out from practical experience at the plant.

Has Worked in One Quarry Since 1884

IN this day and age of unrest and discontent it is seldom that a man is found who can boast of a record like C. R. Swenson, veteran quarryman of the Babcock & Willcox plant at Kasota, Minn. This month he completes 40 years of continuous service with that firm and during that period has never worked for any other men.

Mr. Swenson's career of devotion to his duty is an interesting one from many angles. He started in with the then struggling Babcock & Willcox firm on May 11, 1884, as a quarryman. He worked as a laborer until 1887, when he was made foreman of the quarry gang, and has been foreman continuously for 37 years. He was 19 years of age when he started to work in the quarry and has given the best of his life in service. He expects to spend the remainder of his days of usefulness at his old job in which he takes paternal pride.

When the veteran workman started in the quarry game, it was not like it is today. In those days, they did not have the modern machinery of today, but stone mining was done in a much cruder and more laborious way. Everything was man power, from drilling the big ledges to hoisting them onto the horsedrawn stone "jiggers" with a hand-cranked derrick. A long drill and a hammer were the principal tools used by the men.—*St. Peter (Minn.) Herald.*

Alabama Quarryman Buys Another Quarry

C. A. EAST, who owns and operates the East Quarries at Rock Springs, near Birmingham, Ala., has purchased the quarry of the Woodstock Iron Corporation near by and will put it into operation at an early date. The property is one of the largest producers of lime and fluxing stone in the district. It includes about 40 acres of land. —*Birmingham News.*

Lehigh Portland Cement Alleges Discrimination

THE Lehigh Portland Cement Co., with headquarters in Allentown, is being forced out of competition in a large section of the Southwest territory and at port terminals because of "unfair, unlawful, and prejudicial discrimination in freight rates," its officials charged in a complaint filed with the Interstate Commerce Commission at Washington recently.

Through F. E. Paulson, W. F. Clark and E. S. Gubernator, of Allentown, litigation was instituted by the Lehigh company against practically every carrier east of the Mississippi river.

The commission is informed in the plaintiff's bill of particulars that for several years the carriers have been exacting transportation charges on products shipped from its mills at rates that are higher than those charged competitors.

Investment Opportunities in the Non-Metallic Minerals Industry

By Kirby Thomas
Mining Engineer, New York City

THERE are plenty of securities available in the general markets of this country and abroad, based on the industries engaged in the production of the precious and base metals and of iron, coal and, oil or gas. Many of these securities have long consistent records of high returns on the current investment prices and many of them show very great advances in the market over the prices at which they were first distributed to the public. Some of them have made sensational returns and enhancements in value. There have also been large losses on these securities due to the hazards and vicissitudes or business generally, and particularly to the inherent risk in such investments, especially in metal and oil undertakings.

The iron, coal and oil enterprises, because they supply the raw material for the general industries of the country, are particularly susceptible to the effects of general trade conditions, especially when the conditions are declining or bad. Therefore, mining and oil securities generally have come to be considered as distinctively speculative and most conservative investors distribute their commitments in other lines, also as a precaution, notwithstanding the generally lower profit record of the industrial, railroad, utility and government securities compared to the successful mining and oil securities.

A line of securities which promises to combine some of the safety and stability of the standard investments with the speculative and large profit features of the mining and oil stocks, have recently been made available by some of the rapidly expanding industries engaged in the production and realization of the non-metallic minerals, other than coal or oil and gas. The extent, diversity and growth of these industries is not generally recognized by the public and very few of the securities in this new field are today on the stock markets, or can be obtained from accredited distributors.

Speaking of the development of the non-metallic mineral industries of the United States, Raymond B. Ladoo, former technologist of the United States Bureau of Mines, engaged in investigations in this special field says: "Lack of coherence and united effort in the inorganic non-metallic mineral industries, as compared with the methods adopted in the mining of metals, coal, and petroleum, has allowed the important group of minerals to remain in comparative obscurity. During the war, attention was temporarily drawn to certain essential minerals, formerly imported in large quantities, such as graphite and magnesite, but the relative importance of the whole group has not been generally appreciated."

More than 32 different products are included in the list of the output of the non-metallic industries in a recent official publication. The actual value of the non-metallic minerals, excluding coal, oil and gas, and gems, is estimated to exceed $850,000,000 for the United States. Official statistics give the valuation 1916, as $534,000,000 and the value ratio of the non-metallic output to the fuels (coal and oil and gas), and the metals (including iron) as 1.0 to 2.5 to 3.1. A further measure of the actual and relative importance of the non-metallic operations is afforded by the authoritative comparison that the non-metallic mineral products of Pennsylvania (exclusive of coal and oil and gas) alone in 1917, exceeded in value the total value of all mineral products, including oil, from either Texas, Utah, Missouri, Colorado, Nevada or Idaho.

This is indeed a surprising proportion considering the very small number and amounts of securities based directly on the non-metallic industries which are available for investment or trading. This is partly, because the non-metallic minerals seldom are sold to a primary market, but they are used as the raw material for some industrial operation which is engaged in business, generally or partly concerned with the non-metallic materials, or in the complete preparation of the crude natural material for the ultimate consumer. In such cases, the importance of the operations in the non-metallic raw material is submerged in the manufacturing aspects of the business. Nevertheless, the control and the cheap supply of the primary material is the real basis of such businesses and they are coming to be more generally recognized by the investment public.

In many branches of the non-metallic field, the operations are now becoming more organized and better correlated to the immediate and ultimate markets for the products so that securities, based primarily on the intrinsic natural resource value of the reserves and supplies of the raw non-metallic materials, will find appreciation and more understanding buyers and wider markets.

Use of Agstone with Ammonium Sulphate

EXPERIMENTS were started at the New Jersey Agricultural Experiment Station in 1898 for the purpose of studying certain phases of the nitrogen problem as related to crop production. The nitrogeneous materials used are nitrate of soda, sulphate of ammonia, dried blood and cow manure. The work has been carried on in small cylinders placed outside under normal weather conditions.

For the first 10 years the nitrogen treatments were run in triplicate with uniform lime treatment for all. Beginning with the second 10-year period, they were divided into three groups—A. B, C—with reference to the lime treatment. Those in Group A receive no lime; those in Group B are limed (two tons of ground limestone per acre) at intervals of five years, and those in Group C are limed as in Group B, and, in addition, receive a certain amount of nitrogen through legumes twice during a five-year period.

The continued use of sulphate of ammonia without lime has resulted in a soil so acid as practically to inhibit growth. The corresponding limed soils yields normal crops.—*Industrial and Engineering Chemistry.*

Oxidation of Sulphur an Important Agricultural Change

By Professor George A. Olson
Gypsum Industries, Inc., Chicago, Ill.

READERS of Rock Products who share interest in problems relating to the general welfare of farmers undoubtedly will want to peruse the researches conducted at the New Jersey Agricultural Experiment Station relative to the influence which moisture, air and various chemical substances exert on oxidizing organisms. In these studies sulphur, floats and greensand were used.

The oxidation of the sulphur increased the acidity as would be expected. Oxidation of sulphur transformed insoluble phosphate into acid-soluble phosphate, but the process of conversion was slow when an over proportion of floats was used. Through gradual additions of floats and sulphur it was possible to speed up the conversion and build up the concentration of acid soluble phosphorus. Both soil and greensand marl were used as the inert material to build up the sulphur floats mixtures. Some of the insoluble potash in the greensand was also changed to the soluble state.

In part one of Bulletin 374 a review of literature pertaining to importance of sulphur in agriculture is given. There are 241 references to bibliography appended.

Alabama Cement Rates

RATES on cement between points in Alabama have been attacked before the Interstate Commerce Commission by the Lehigh Portland Cement Co. of Allentown, Pa., according to a report received by the Public Service Commission from the Interstate Commerce Commission. The company established a plant at Boyles, Ala., near Birmingham. alleged that intrastate rates are discriminating against interstate commerce. It recently

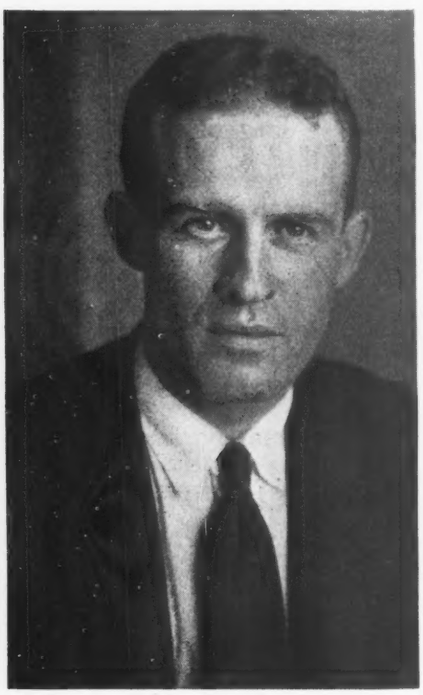
Convention of the National Lime Association

Results of Research Work Point to Important Developments in Lime Technology

THE outstanding features of the sixth annual convention of the National Lime Association at White Sulphur Springs, W. Va., May 20 to 23 inclusive, were the rapidly growing interest in, and the growing appreciation of, the technology of lime manufacture. The work of research chemists in their investigations into the nature and use of lime is just beginning to be co-ordinated and applied to the manufacture of lime. The number of chemists and engineers in the lime industry is increasing and doubtless will continue to increase.

By far one of the most interesting sessions of the convention was an evening session devoted to an informal round table discussion by lime technologists—the first, so far as we know, in the history of the American lime industry, and the first, we trust of many similar conferences to take place in time to come; for these are sure to prove the training schools of future lime manufacturers—managers and superintendents.

The progress made in the development of lime building tile and blocks during the past year has proved eminently satisfactory. The experimental plant at York, Penn., has been completed, its machinery and equipment perfected and its product—a lime building tile



Burton A. Ford

George B. Wood

—has been accepted for two important construction jobs at York. This work has been done by W. A. Freret, consulting engineer, and J. W. Stockett, chemist, of the National Lime Association. Blocks can now be produced on a commercial scale at a cost as low or lower than cast gypsum block, or tile of similar shape, or concrete tile. They can be made of about the same weight as gypsum tile, with ample absorption properties, and with more than sufficient strength to meet specifications for gypsum tile. The lime tile will weather better probably than gypsum. There is no reason to doubt their permanency.

The progress of the quick-setting lime plaster investigations has been somewhat complicated by the fact that the characteristics of various individual limes seem to exert an important influence on the reactions involved. It would seem that while the work done in the association laboratory and in the field under the direction of Dr. G. J. Fink, chemical director of the association, is of fundamental value, the problem of a quick-setting plaster is one that will have to be studied in connection with the particular lime under consideration. J. E. Underwood, assistant chemical director, is supervising actual construction jobs which are likely to prove of much value to the lime industry.

As Dr. Fink pointed out in his report of lime plaster investigations, probably the most important result of the association's work and the publicity which will follow the publication of the patents covering it (two in Canada have already been allowed) will be the stimulus given to other investigators and experimenters. The more working on the problem, naturally the quicker it is likely to be definitely solved. Indeed two independent experimenters—Henry Angel of the Kelley Island Lime and Transport Co., Cleveland, Ohio, and J. J. Urshell, of the Woodville Lime Products Co., Toledo, Ohio, believe they have already found the solution, and samples of their plaster at the convention were surely encouraging.

The most valuable contribution to the technology of lime manufacture was a paper by W. R. Phillips, general manager of the American Lime and Stone Co., Bellefonte, Penn., one of several engineers who have within recent years reached high places in the lime industry. His illustrated talk of the operations of his company went exhaustively into the subject of limestone mining and the burning of lime in rotary kilns. This company is one of the first to adopt

Fred Wilmer

mining on an extensive scale and, according to Mr. Phillips, is eminently pleased with results, both as to better quality of stone and as to cost—which, all things considered, can now be brought to about the same as the cost of open quarrying.

The paper of Gordon Willis, president of the Peerless White Lime Co., St. Louis, Mo., also emphasized the economies and advantages of mining limestone.

The report of promitional work by various members of the staff of the association showed remarkably encouraging prospects. The report of R. P. Brown, construction engineer, describing the building of the Muscle Shoals dam and wonderfully satisfactory results obtained from the use of hydrated lime in the concrete mixtures, showed the progress made in this line. For the dam is being built under the direction of the Corps of Engineers of the United States Army, which, as every professional engineer knows, is the highest endorsement possible for the use of lime in concrete. It is used here because it unquestionably increases the *workability* of the concrete mix and prevents segregation of the aggregates when chuting it long distances and into difficult form work.

If the results of experiments made by Dr. W. H. McIntire, head of the department of soil chemistry, University of Tennessee, reported by him at the convention, bear fruit, it may be proved that the use of hydrated lime in concrete is of advantage in the prevention of its disintegration under certain conditions that sometimes arise.

The Champions

While the convention was held at a place generally regarded as a health and pleasure resort, it seemed to the writer that the sessions were the best attended of any convention in the history of the industry, and more real progress was made in convention objectives than at any previous convention. Every afternoon was devoted to pleasure seeking and sports—golf, tennis, quoits and baseball—which not only made for more good fellowship but seemed to put the members in better mental condition to absorb some of the rather intricate technical information which was fed to them in large doses during the morning sessions.

The golf champion of the lime industry proved to be "Jim" Gager of the Gager Lime Co., Sherwood, Tenn. Other winners of trophies, contributed for the occasion by the Valve Bag Co. of America, were Howard I. Siegrist, insurance expert of Bridgeport, Conn., who specializes in lime plant insurance; Loring Cover, Jr., of the Security Cement and Lime Co., Baltimore, Md.; J. J. Urshell, president of the Woodville Lime Products Co., and Lowell M. Palmer, president of the Palmer Lime and Cement Co., New York City. The winner of the tennis championship was Burton A. Ford, general manager of the association and the quoit tournament, R. C. Towles, of the Washington staff of the association. The baseball team representing the Central States industry was beaten, 7 to 6, by the team representing Eastern manufacturers. Several well-known lime manufacturers proved quite adept in the game—and suffered from mutilated fingers and stiff joints the morning after.

All in all, the convention was conceded to be the best ever and it was generally agreed to hold the next one under similar auspices at French Lick, Ind.

The Valve Bag Co. of America not only contributed the prizes for athletic contests but a dinner and evening's entertainment at the Kate's Mountain Club house, which will be most pleasantly remembered by all.

Progress in the Lime Industry

By George B. Wood
President, National Lime Association

IN olden times the traveler by stage coach marked the progress of his journey by the milestones which he passed on the way. With the exception of well-known landmarks on familiar roads of travel, these milestones were the only indication to him of the progress he had made towards his goal. And even today the traveler watching from his train window sees the milestones along the right of way flash by one by one, marking progress on his swift journey.

So we may say that progress toward any goal, whether of accomplishment, of co-operation, organization or any endeavor, is marked by definite milestones.

These annual conventions of our association, the national organization of our important basic industry, may be considered as milestones marking the advancement of our united progress along the road which leads to the ultimate goal of accomplishment and leadership. Reward for our efforts should not be measured by reflected profit to ourselves alone. We should always have in mind our duty as a national institution to render a maximum of useful service to the public and also to the thousands of workers whom we collectively employ.

Each succeeding year increasing progress is reported at our annual convention. I will not undertake to enumerate the accomplishments of the past year but leave the reports of our association manager and the technical staff to speak for themselves. Suffice it to say that the work of the past year has been effective, much that is original has been accomplished, and your association staff at Washington is functioning today with the best of teamwork and ambitious earnest effort. We must never be satisfied with the tasks which are done, but rather always be determined to do greater and better things each succeeding year.

Our convention this year is unique for us. This is the mid-season gathering of a two years' program of co-operative work. The question of association dues or the question of constitutional amendments is not on the program. We are met for the common purpose of learning more about our own particular business and also of meeting and learning more about our fellow manufacturer and his personality. Before any man can put his heart into co-operative association work he must realize that a competitor is not an enemy after all but an ally, and that by helping him the man likewise helps himself.

Getting New Business

Getting actual new business is not a matter of inducing the customers of a competitor to come to you for products similar to what they were getting at the other place. New business, extra business, should be created from without the old established circle of trade. That is the purpose of concerted publicity, that is the purpose of concerted research work of an industry such as ours.

This is the first convention of our organization held at a resort, where all of us are housed within common walls and where recreation and good fellowship have purposely been given a place on our four days' program. I urge you all to get out and play. Meet your new brother lime manufacturer and become better acquainted with the old. Remember that we are all partners in this enterprise, an association whose never ending work is to educate more users to use more lime.

No one manufacturer could afford, or should afford to undertake such a task. He may be able to accomplish something but it would take him years and cost him a fortune to accomplish the same work which co-operative effort can perform in less time and at slight cost to the individual.

Our association is gaining membership and we must not be discouraged by the fact that 100% of the lime makers of the United States are not yet members. The same is true with every other trade association and success has been their reward wherever an honest business with an honest product, essential to the public need, has united for co-operative advertising, regardless of the number of those who choose to receive but never pay.

Before the War 90% of the business of the walnut lumber manufacturers was export. During the War the entire production was used for gun stocks and aeroplane propellers. At the end of the War the export business was dead and the American Walnut Manufacturers Association commenced a co-operative advertising and publicity campaign. Today the volume of business is greater than before the War and 90% of the product is consumed in American markets for furniture and cabinet work. One half of the industry has paid the bill, the other half has shared equally in the benefits, but the industry was saved.

Our own association can be justly proud of its accomplishments. We have passed the period of uncertainty and doubt and can proceed with assurance that our work will

be rewarded, not only by increasing markets for our product, but by increasing service to the public and steadily increasing support from those manufacturers who have as yet remained aloof.

A prominent Eastern sales agent of a large and well known non-member line manufacturer has recently published in a leading national architectural magazine a most creditable article on the use of lime in construction. He quotes freely and verbatim from National Lime Association bulletins, and let us not feel affronted at this compliment, but rather rejoice that once again, and here from a most unexpected source, the work of our association is recognized as worthwhile and constructive.

Never in the history of the lime industry was there a time when co-operation on the part of all was more needed than today. We are passing through a period of revival in building construction which has caused a demand above normal for the product which we manufacture. Many new lime kilns have been erected in various parts of the country to meet the increasing demand. Building programs invariably fluctuate, the consumption of chemical lime varies greatly in many important uses, and the demand of the farmer for agricultural lime depends upon prosperity in his business.

When an industry is serving a market which is forever growing and expanding into new fields of usefulness, then and then alone is its true justification for increase in its productive capacity.

Let us all put our shoulder to the wheel, carry on with the good work we are doing, and make our markets grow. We have passed many milestones on the road to our goal, and if we join hands together we will find in our united strength a power which cannot fail to win.

Accomplishments of National Lime Association

By Burton A. Ford
General Manager, National Lime Association

As a preface to this year's report of the general manager, I think it wise to call attention to the structure of the present National Lime Association and thereby lay the foundation for a complete understanding of what is to follow.

At the 1922 convention a report and recommendation of a special committee on association policies was adopted by the membership. This report specified recommendation as follows:

1st. That the present method of administration be continued, namely, that a general manager and assistants at headquarters be maintained, and have supervisory powers over divisions and districts for the purpose of co-ordination.

2nd. That the present provision of the by-laws, Article 5, Section 2, requiring any company to be a member of the national body as a prerequisite to membership in any subsidiary body be not changed.

3rd. That the dues of the National Lime Association for the national headquarters program shall be 5 cents per ton, based on 1922 tonnage, with a guarantee of a continuation of membership for a two-year period, and that members shall be required to sign a commitment to that effect. That dues for field promition shall be an additional amount fixed by the members in the division. We recommend, however, that such field promition dues be not less than 10 cents per ton in any district or division.

The work of the national headquarters office has during the period since the last convention, been carried on in accordance with the above. There has been harmony between the staff of the headquarters office and the managers of the eastern and central divisions, and it has been with a great deal of gratification to the administration of the national office that such has been the case. Frequently the association technicians are called upon by the managers of the promotional work to assist with advice, criticism of reports, and so on. The division offices have distributed large amounts of national association literature. As during the preceding year, members of the staff of the national office have been helpful to the divisions in the matter of investigations.

National Headquarters Office

It is with the work of the national headquarters office, however, that the general manager has spent the greater share of his time.

Following the convention of last year, it was necessary to obtain two-year commitments from our members, and as such a policy was entirely radical from anything ever before attempted in American trade association work, a great many personal visits were made to member companies in various parts of the country. Following the receipt of the comitments from members of the eastern and central divisions, a trip was made to the Pacific Coast at the invitation of, and with the expenses borne by, our former members of the western division. At the present time our organization is indeed upon a firm basis, with members in all parts of the United States signed up to the two-year program, which will be concluded on June 30, 1925.

I cannot express too strongly my opinion that in large measure the most gratifying results obtained during the past ten months are accounted for by the high degree of stability of the present National Lime Association. There has been a most satisfactory feeling among our members and among the members of the staff, and our efforts have been directed towards the accomplishment of results.

Membership and Finances

At the time of the 1923 convention we had eliminated from our membership lists all of these who had previously considered themselves as members, who had not fulfilled their financial obligations to the Association. Since that time we have gradually increased our membership until today we have an income of over $100,000 available for national work, and we look forward enthusiastically to the addition of many new members to our ranks during the coming year.

Determination of the Most Important Work

At the 1923 convention the general manager presented a list of important subjects which should, as time and money become available, be undertaken as national projects. About one-half of these subjects have been, to a greater or less degree, undertaken during the past year.

In addition to the large amount of daily correspondence with members, divisions and contacts of a national character, our staff has been actively employed in the writing of bulletins, which means investigational work of a most intelligent character, the criticism of many articles appearing in the trade press, the criticism of member companies' advertising which is often submitted to us, participation in the work of scientific organizations, such as the American Society for Testing Materials, the routine determinations from member companies' limes, handled by our laboratory, the supervision of a large number of important fellowships, the issuance of the Agricultural Lime News Bulletin, and many other things about which our members are informed. Likewise, we are still being called upon for investigational work to determine the cause of so-called failures. Just recently our construction department was instrumental in aiding the central division manager to disprove that lime was the cause of the mortar failure in the new stadium at the University of Illinois.

As stated last year, it is not possible nor practical to abandon all other work in favor of so-called major undertakings, but in so far as has been possible, we have directed the greater part of our energy and knowledge to the solving of two important problems. We refer to the quicksetting lime plaster investigations and the investigations looking to the commercial manufacture of the lime building block.

New Problems

There are several important problems which we have not as yet had the time nor the money to undertake, but some of them we will be able to work on during the coming year. There is one subject in particular which appears to open up a large field for increased tonnage, and that is the use of lime in the treatment of trade wastes.

Conclusion

In conclusion, I want to thank the members of the National Lime Association for their support of our program. We have not yet scratched the surface in our exploration of the field of lime. The indus-

try is growing rapidly, new people are entering the field, and if through our research and intelligent trade promotional work we are enabled to open up new avenues and to extend old ones, the National Lime Association will have in every sense of the word justified its existence.

Report of Agricultural Department

By R. C. Towles
Soil Technologist, National Lime Association

THE agricultural work of our office was taken over by myself last September, in addition to my duties as assistant to the general manager. This change in personnel was brought about when Professor Slipher, who had been in charge of the soils department, resigned to go back to Ohio. In as much as my work in connection with attending to the routine of the office management minimizes the amount of time I have available to devote to the agricultural department, we thought it well to secure outside assistance, and by way of accomplishing this end we were able to retain in a consulting capacity the services of two soil experts, in the persons of Dr. A. G. McCall, formerly of Ohio State and now head of Soils Department of the Univercity of Maryland, and Professor J. A. Slipher, now of Ohio State, and whom you all know.

Since effecting this new organization of the agricultural department we have found the work to run along smoothly. With the assistance of our consultants we have been able to despatch with reasonable promptness all the various problems which have so far presented themselves.

In making a summary report on this department's actual activities since the last convention it would be pertinent, if time permitted, to enumerate some of the problems that come to light almost daily through correspondence. The stimulus which the work has been given in recent years has naturally laid us open to the public as a sort of cross between a target and a clearinghouse, at which are fired questions of doubtful significance and into which is dumped material that has grown too hot to handle on its home hearth. Some of this inquiry and advice calls for research and investigation, much of it calls for consultation and reference, and all of it calls for time.

Publications

About the first move made after stepping into the soil work was to go over with some of the state experiment station and U. S. Department of Agriculture workers, the literature we already have available in bulletin and circular form, with the view to determining its worth and adaptability. It was found that so far as had been gone, our data are entirely up-to-date and in general cover the ground very well. There of course are many omissions and gaps to be filled in on various subjects and a few fields have been touched only lightly or not at all. Steps were taken then to round out this work, and just recently we published in bulletin form an article showing the part lime plays in animal nutrition. Another somewhat similar paper has been prepared and will be published in bulletin form an article showing the part lime plays in animal nutrition. Another somewhat similar paper has been prepared and will be published, in which the technique of the application of the principle has been gone into in detail. We will also have off the press before the end of the fiscal year a bulletin with reference to the use of lime in controling insects affecting garden and truck crops.

The Agricultural Lime News Bulletin, which made its first appearance about four years ago, and was then published monthly, has continued to review information of the farm uses of lime, including experiment station and government bulletins on both technical and popular matter and the more important articles in the agricultural press; it has endeavored to collect and present some heretofore unpublished data, has carried brief seasonal articles touching different phases of the use of lime on the farm and has attempted to promote an up-to-date idea of the functions of lime in the agricultural field. The original policy of monthly issues has been changed to that of printing an edition whenever sufficient data have appeared to warrant a review. During the past year, three issues of this paper, 10,000 copies each, have been published and distributed to county agents, agricultural teachers and others interested, and a fourth edition will appear before the fiscal year ends next month. This organ seems to have filled a unique place in its particular field; there are many letters in our files to show that a number of our contacts, including even technical men, have come to look upon the Agricultural Lime News Bulletin as the official organ of its kind.

Fellowships

Since the last annual meeting we have been successful in securing the University of Wisconsin to co-operate with us in an effort to obtain some much needed information on the value of fractional rates of soil liming. This is one of our important problems, in that it has a direct bearing on the farmers purchasing power. By this I mean that under the fractional system the initial cash outlay is considerably less than under the old system of making a single application to cover a period of years. There are already at hand data of an affirmative nature from Pennsylvania, Virginia, New Jersey and some other states, but such data were developed for the most part as incidental to other observations whereas this project that we now have at the University of Wisconsin under Professor Whitson, is sufficiently specific to warrant the expectation of some conclusive data. This work needs to be extended over one entire crop rotation, and carrying it through two rotations would be advisable.

A fellowship has also been launched at the University of Nebraska. It is to determine the effects of liming materials on the physical structure of soils, with particular reference to granulation, a problem that is of grave importance to our industry. The general condition existing here is much the same as that surrounding the fractional liming project as there is a paucity of data because the field is comparatively new. This project at Nebraska is quite comprehensive, involving the principle soil types from all over the country. It is therefore outlined to give results which will be of wide scope, and we were quite fortunate in getting it installed at Nebraska, where it is being directed by two very eminent soil physicists, Professors Burr and Russell, men whose works are valued most highly by their contemporaries.

We have also outlined in conjunction with our construction department, a project dealing with the effect of lime in dirt roads. This is being worked on by a fellow of the University of Missouri, under the direction of Dean McCaustland. It is outlined to demonstrate the principle of soil flocculation under lime treatment.

Our basic agricultural fellowship, which has been in progress at Tennessee for some time, was duly provided for during the past year, and the work is running smoothly. It is under the direction of Dr. McIntire, whose name on an agricultural lime paper is considered in about the same light as is the word "sterling" on a piece of silver.

Each of these problems we wish to follow up during the coming year, and in addition we hope to be able to start investigations at appropriate places of both agricultural and horticultural significance which will reveal new and valuable avenues for the distribution of our product.

Construction Report

By R. P. Brown
Construction Engineer, National Lime Association

FOUR entirely new bulletins, and one revision, have been issued this year. The new bulletins were prepared in response to a strong demand from the field, and have met with a pleasing reception. They are: 300-A, Lime and Lime-Cement Brick Mortor, 304-B, Whitewash and Cold Water Paint (which is a simplified summary of the technical investigations conducted previously by the chemical department), 305-A, Standard Specifications for Lime Plaster, and 309, Building Code Requirements for Lime.

The plaster specifications have met with unusual success among architects and we

learn from the field that this bulletin is aiding materially in bringing lime plaster back to its rightful place in the building trades. These specifications are referred to directly in the report of the committee on lime appointed by the building officials conference and should in time, avoid many of the unpleasant restrictions which unfortunately exist in some building codes.

The revision was of Bulletin 307, Lime Stucco, and consisted of certain modifications of the original specifications. The Salesman's Manual, issued a year ago, is still in demand and there are now over 300 copies in use. Due to the many requests for copies for use by building supply salesmen, it may be necessary to slightly revise the present issue and re-issue it in such shape that it may be used more generally. Public and reference librarians requesting such a publication indicate an increasing interest in the construction uses of lime.

Material has been gathered and manuscripts prepared for two more new bulletins, one being on the work at Muscle Shoals, and the other on the subject "Hydrated Lime Makes Concrete More Workable."

The foregoing bulletins have all been reviewed most favorably by all the leading trade and technical publications, and the ones on Whitewash, Plaster, and Stucco have been reprinted entire in two technical magazines. Two technical papers have also requested articles on the use of hydrated lime in concrete, which were prepared and published.

Considerable time has also been given to the study of building codes and their relation to lime. We have followed up the lead developed last year with the building officials conference, and as a result present Bulletin 309, which is the report of the committee appointed to study and report on our recommendations. This report was accepted and adopted as a tentative standard of the conference and the committee continued. This, of course, gives us still another opportunity to bring lime before these building officials. The tentative report on "Minimum Requirements for Masonry Wall Construction," recently issued by the building code committee of the U. S. department of commerce gives the most favorable recognition of lime mortar that we have yet secured and should go far toward giving lime its rightful place in the building trades. Both divisions are, of course, working on their local building code problems and this office has cooperated in the preparation of briefs and in supplementing by correspondence and data, the work of the field men.

Work in connection with the A. S. T. M. has taken more time this year than last because the speaker was elected secretary of committee C-7, on lime, which involved considerable extra correspondence and study. Specifications for both quick and hydrated lime for structural purposes have been studied during the year and we have, of course, participated actively in the discussions on behalf of the industry.

Experimental work has been conducted and encouraged wherever possible and we are watching carefully the new fellowship on acoustics at the Bureau of Standards and the one on the effect of lime on dirt roads at Missouri, which is under the joint supervision of this office, the agricultural department and the central division office. In both cases the preliminary results are decidedly encouraging and we hope by next summer to have some valuable information available for general use.

We expect to learn, through the acoustics fellowship, exactly how lime plaster functions in reflecting, absorbing and transmitting sound. Each coat is being tested separately and the finished plastering is being tested on various kinds of backing, such as wood lath, metal lath, brick, etc., used in ordinary building construction.

The concrete section at the Bureau of Standards reported to the American Concrete Institute some most valuable results in connection with the effect of hydrated lime on the workability of concrete which we have summarized and expect to publish shortly.

Since the first of the year a good deal of traveling has been necessary. The four salesmen's schools or conferences held by the Central and Eastern divisions were attended and a part taken in the discussion. These meetings have been particularly profitable to us in bringing out the needs of the men on the "firing line" and our work will be governed accordingly so as to produce the greatest value possible to all. Several days were spent at Muscle Shoals, Ala., gathering data on that project for use in connection with the proposed bulletin. At one time it looked as though lime was being unjustly blamed for some mortar trouble at Champaign, Ill. We made an inspection on the job and were able to convince all parties concerned that the lime was not in any way responsible for the trouble that had been reported.

Publication and large building supply dealers are now turning to the National Lime Association for co-operation. We are reviewing the advertising issued by two magazines at the present time, one of whom is asking us now to even prepare the copy. A number of dealers and companies handling materials with which lime may be used have asked us to prepare sections for their annual catalogs, which has been done. We have also had the opportunity of reviewing and revising sections in certain of the handbooks published for general use.

The result of the work of the past years is now becoming increasingly evident and we do not hesitate to prophecy that each succeeding year will make the results of association work more and more valuable in the way of actual tonnage.

Report of Chemical Activities

By G. J. Fink
Chemical Director, National Lime Association

THE activities of the chemical division of the association work may be grouped under three major heads, viz., (1) investigational; (2) promotional and publicity; (3) service.

There are fundamentally two methods by which lime tonnage may be increased. These are first by learning more about lime and by this knowledge being able to extend its uses; and second, by expanding those uses for which we already know its function, value, etc.

The first activity involves both research and experimental work. This, as you know, is carried on both in our own laboratory and fellowship arrangements with various institutions. In a report such as this we can give only a casual survey of the work as a whole and can refer only to a few of the particular activities. The details of larger investigations such as that of the quick-setting plaster problem will be presented at another time.

In the Washington laboratory we have found it advisable and necessary to spend a large proportion of our time on construction research which includes the quick-setting plaster problem. The other laboratory activities may be roughly grouped under three heads, viz., properties of limes, analytical methods and new uses.

Studies of Individual Lines

Strange as it may seem, there exists very little information in the literature regarding commercial limes and we are finding it more and more necessary every day to study limes from the physical and chemical point of view. We believe that in order to promote our product we must first know what it is and why it has certain values in connection with its various uses. So one of our important problems this year, as in the past, has been the continuation of the work on the fundamental properties. In this connection Mr. Underwood has collected considerable experimental data on the reactions of lime with gases such as carbon dioxide. He has also found it necessary to investigate rather thoroughly some of the analytical methods which have been recommended for various determinations in connection with lime analysis. All of this work has brought to light a number of interesting facts which we expect to publish within a short time.

The work under the various fellowships continues to develop extremely interesting and valuable information. The problems which have been undertaken under these fellowships represent two very different types of problems. The work at Ohio on the use of lime in the treatment of sewage and trade wastes should have an immediate practical value and we believe will open up one of the greatest possibilities for lime.

The work at the Massachusetts Institute of Technology on the other hand is more of the theoretical type, but it has developed a number of facts which may be of great practical value in explaining certain properties connected with the uses of lime and possibilities for the extension of its uses. The work at the Bureau of Standards which was temporarily discontinued about the first of January by the removal of Mr. Stockett to the block plant at York has included a study of the effect of certain impurities on the products obtained by burning various stones or various mixtures of limestone and other materials. The immediate results of this work apply particularly to the quick-setting plaster problem but the indications are that it will develop other facts relative to the possibilities for burning impure stones which will be of considerable value to the lime manufacturers.

The work on the use of lime in textiles at James Millikin University has been continued by Professor Darling and has demonstrated still more conclusively the value of lime in this industry.

Although the fellowship at Indiana University was discontinued, Professor Mathers and several of his students have been working on lime problems and we have co-operated with them in every possible manner. most of this work has a direct relation to the quick-setting plaster problem.

In addition to these more or less direct relationships, we have co-operated in and encouraged investigational work with a number of institutions, laboratories and individual manufacturers. In this connection we might mention the work by Dr. Bowles at the new Nonmetallic Minerals Station at New Brunswick. The lime manufacturers have received copies of several publications from this station and we wish to urge in this connection that they co-operate with Dr. Bowles in supplying the information which he has requested in various questionnaires. His work looking toward the development of new uses for limestone fines, his study of the problems connected with the burning of small stone and his report on the mining of limestone certainly indicate that this station is to be prolific of investigations of great value. At Cornell University Professor Rhodes has several men working on lime problems, one of which involves a study of the factors in connection with the use of lime for the manufacture of bleaching powder. Work on another phase of this problem is being conducted by Mr. Emley and his men at the Bureau of Standards.

Increasing Interest in Lime Research

We have been much gratified recently to learn that a large number of industrial laboratories and individual companies not directly connected with the lime industry are becoming interested in lime problems. We have co-operated with a number of these laboratories in supplying samples of stone and lime and in furnishing information concerning lime which has been required in the presecution of their investigations. Association publicity is bearing fruit from this direction.

It is safe to estimate that as a result of this fellowship and co-operation program there are at least thirty men outside of the industry who are engaged in chemical lime research. We are endeavoring in every possible manner to encourage this work and to multiply this number, to co-ordinate the work as efficiently as possible, and to untilize the results of the work to the best advantage of the lime industry.

Our research necessarily involves a complete record of current literature and we are endeavoring in addition to cataloging the current material, gradually to enlarge and ultimately to complete our file of old literature. We are gradually accumulating complete bibliographies on the various properties and uses of lime which will contain all of the important references in the literature.

Some New Uses of Lime

This literature which we have cataloged in connection with research work has brought to light a number of new uses or extension of old uses for lime. It is unnecessary to enumerate these at this time but a few might be of interest. For example, we find that in most processes for pasteurization of cream, the whipping properties of the cream are almost entirely destroyed and our attention has been called to a product which may be added to such cream to restore its whipping properties. This product is composed almost entirely of hydrated lime.

We also find that lime is coming into wide use for the washing or dusting of molds in which various metal parts are to be formed. This use is receiving particular attention in the aluminum industry and representatives of one of these companies tells us that they whitewash all their iron molds for casting this metal. As the result of this liming they obtain a much smoother casting and find that its strength is considerable increased. A coat of lime not only prevents fusion of the aluminum to the mold but also in the case of one particular alloy at least, actually increases the calcium content of the alloy. It occurs to us that this might be quite a fertile field for the extension of the use of lime. It should be found profitable to whitewash or dust all iron molds.

The use of lime as a catalyst in the manufacture of organic compounds is also being extended. Some of the newer applications include the manufacture of acetone from acetic acid and the preparation of benzoic acid from benzyl chloride. One of the developments which seems to promise considerable tonnage is the process recently worked out for the manufacture of methyl or wood alcohol from methyl chloride by the use of granulated calcium hydroxide. Substitutes for platinum catalysts made from mixtures containing lime with other metallic oxides are finding satisfactory use in the oxidation of ammonia, a process which is extremely important in the development of nitrogen fixation process.

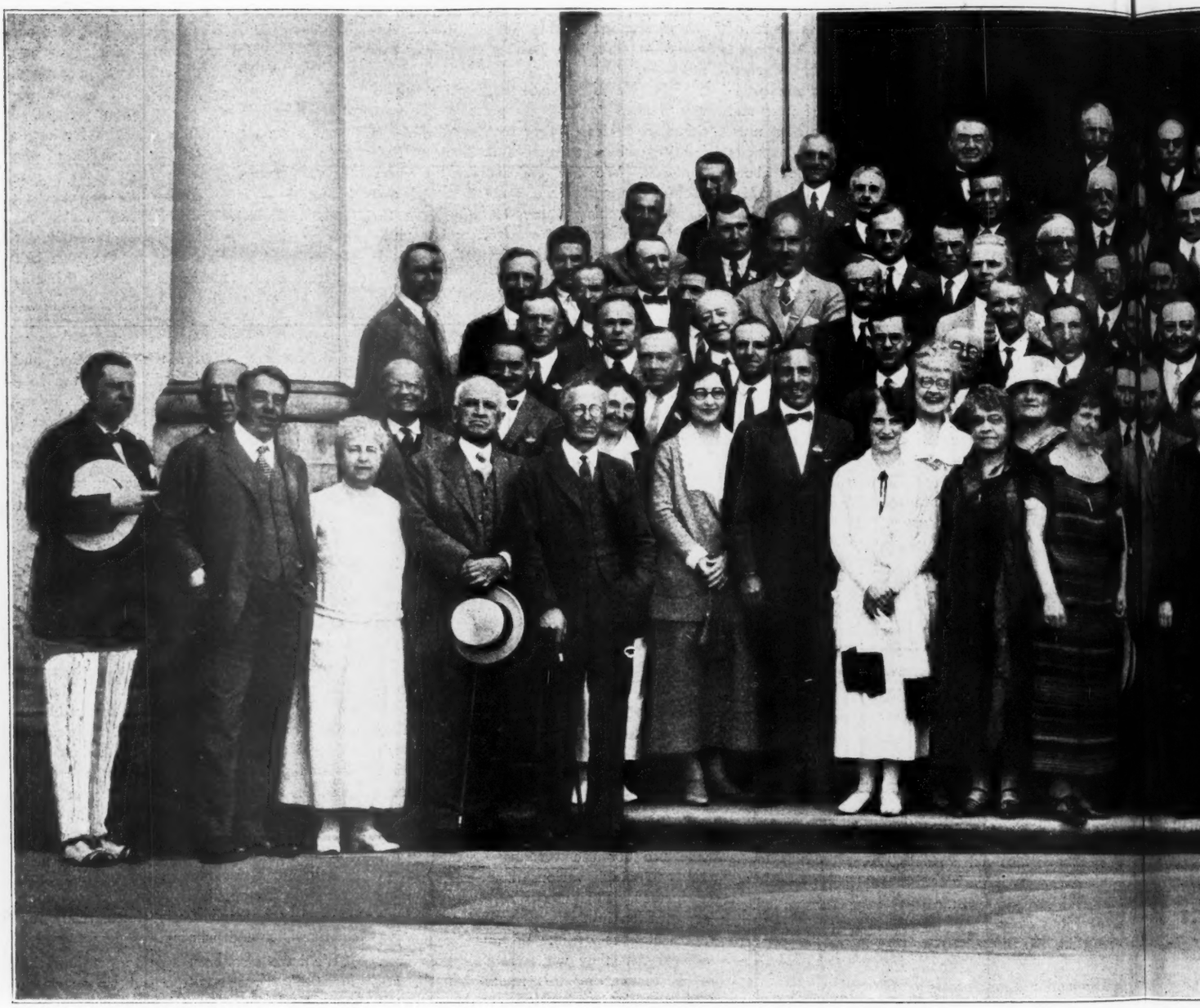
An example of the possibilities for larger uses of lime through the extension of the uses of products made from it as a raw material is furnished by the recent work at the University of Kansas, which has shown that one of the best methods for control of the cinch bug in the corn belt is by the use of calcium cyanide. Lime is used in making this compound.

Handbook of Chemical Data

In connection with the promotion and publicity work and in addition to the routine answering of inquiries by correspondence, etc., we have made definite progress in the preparation of the chemical handbook. This handbook is designated to be a companion of the construction handbook and will ultimately contain three different sections. The first section will describe the manufacture and properties of lime, outlining the chemistry of lime in connection with its various uses. The second section will describe briefly and in popular language the various functions which lime is able to perform with illustrations taken from some of the more familiar processes. The third section will contain a chapter on each of the more important uses of lime, describing the method of fabrication of the material in the manufacture of which lime is used and explaining the functions and requirements of lime in each particular process. Seventeen of these chapters of the third section have been prepared and ready for distribution. It will be our endeavor to complete this book as rapidly as possible. A number of other chapters are in manuscript form, ready for final revision and printing.

We have also been able to get into the form of a rough draft, a bulletin on water treatment. This bulletin describes briefly the problem of water purification, the various processes used, and emphasizes the various uses of lime for these purposes. This draft is being submitted to a number of experts for comments and criticisms and should be ready for distribution within a few weeks. It has been our plan to prepare this first bulletin as a convenient handbook to which anyone interested in water purification can turn to find the answer to most questions which may arise in connection with the general problems.

It has also been prepared in such form that it can be divided up into various sections. We hope untimately to have available popular leaflets describing processes of purification in which lime is used, another calling attention to the value of soft water and describing processes for municipal softening, in which lime is essential, and a third dealing with purification of water for



Members of the National Lime Association and ladies at the convent

industrial purposes. Popular and technical issues of each one of these sections will ultimately be prepared. In connection with the preparation of this bulletin we have visited a number of the larger municipal water purification plants in order to obtain first-hand information. A number of water-purification experts have been consulted and data has been obtained by correspondence from a very large number.

We have also continued to obtain information regarding other uses for lime which will be used in the preparation of briefs on these subjects.

Lime on the Homestead

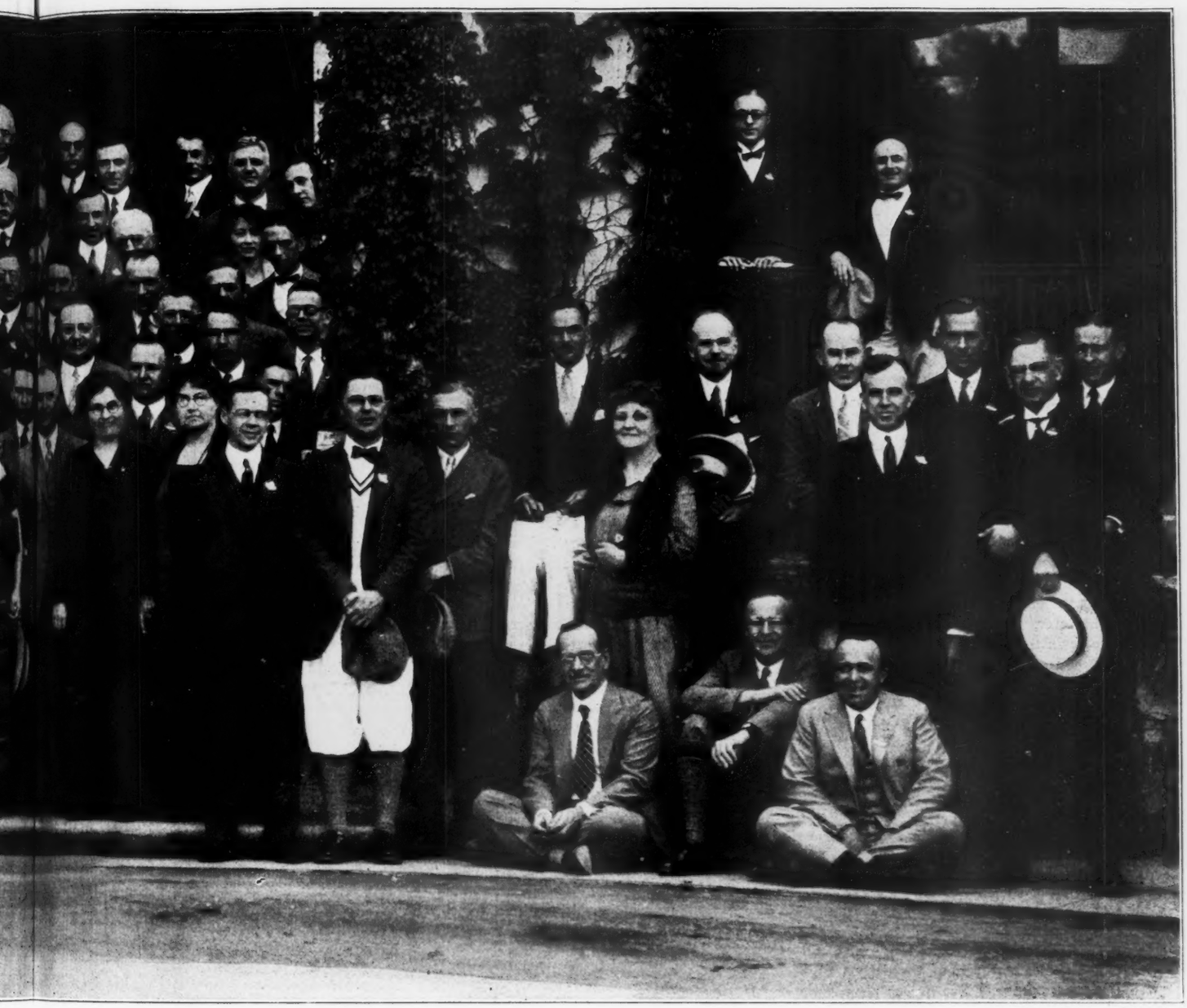
We have also compiled, in the form of mimeograph publications, the various uses of lime on the homestead. This will be sent out to member companies imediately and should be found useful in connection with local advertising of lime, particularly in connection with the 10-lb. bags.

Definite steps have been undertaken looking toward the publication of a reference and textbook on lime. This is to be the result of co-operative work of three different authors. The author who is to contribute the section of the book on the chemistry of lime is at work preparing this material and it will be available shortly. The section of the book to be prepared in our office is being deliberately delayed because we feel that the next few months will see a rapid enlargement of our data on lime and the crystallization of the facts in the more substantial form. The section on the geology of lime will be available by the time our section on the uses of lime is ready.

Three articles are in process of preparation to be submitted to technical journals describing the results of some of our laboratory work.

In an endeavor to make more readily available to the member companies the result of the laboratory investigations, we have prepared data sheets which include what we consider is very important information regarding various limes and which should be very useful to the manufacturer in determining the uses for which his lime is best suited and perhaps should serve as a guide for possible improvement of the quality of his products.

An association advertisement calling attention to the chemical uses for lime was



at the convention at White Sulphur Springs, W. Va., May 20 to 23

prepared and included in the chemical exposition number of *Chemical and Metallurgical Engineering*. Advertising copy has been prepared for a number of manufacturers and co-operation has been given others in the preparation of such material.

Fundamental Sourse of Information

Our headquarters office and both of the division offices have been kept busy during the past year supplying literature for use in the various educational institutions of the country. We have almost daily requests from the heads of the chemistry departments for literature to be supplied to their classes. We also have standing invitations to address the classes in industrial and engineering chemistry in a large number of institutions but unfortunately the time has not been available to take advantage of these opportunities. Mr. Burt, in the central division, has been able to accept a number of the invitations and the results of his talks have been very apparent. We feel that this is one of the very important phases of promotion work and hope that arrangements can be made whereby we can have the time to take advantage of the opportunities in every case. Our chart showing the uses of lime is now hanging in the lecture rooms of the majority of the chemical departments of the educational institutions of the country and we feel it is not only increasing interest in lime but in also attracting the attention of the students to some of the various industries in which lime is used, thereby developing very material potential possibilities.

The extent of the effects of our promotional work, we believe, is well demonstrated by the fact that we frequently have requests for copies of our articles and our literature from England, South Africa, Germany, France, Holland, India, and other countries. Our publications have also been given prominance in a recent English book on "Lime and Magnesia."

As most of you know, we have attended several of the salesmen's schools and have endeavored to emphasize the importance of a thorough knowledge of lime and its uses.

We wish to emphasize that the facts which we develop have little value unless they are used to the best advantage. We believe that the constant and continuous bringing to the attention of the public of the possibilities for the uses of our pro-

ducts must necessarily result to the advantage of the manufacturer. If we can keep people thinking and talking of lime, we have made considerable progress in the selling of our product.

The chemical industries have shown a considerable increase in the past year and it is to be expected that the demand for chemical lime should increase proportionately. Preliminary data indicates an increase in chemical lime tonnage in 1923 of approximately 12%. Among the most interesting possibilities we would include the insecticide industry, water purification and the treatment of trade wastes.

The potential tonnage for lime in a single insecticide, viz. calcium arsenate is considerable. Latest reports indicate that of the 1923 cotton crop only 4.4% of the acreage or 1,674,000 acres out of a total of 38,287,000 acres were treated. The average quantity of calcium arsenate used was 18½ lbs. per acre. On this basis, if only half the cotton crop were treated it would mean a consumption of 145,000 tons of calcium arsenate for which 60,000 tons of hydrated lime would be required. And this represents only one of the uses of one of the large number of chemicals made from lime which are used as insecticides. We should remember, however, that the conditions in the arsenate industry are quite uncertain.

Perhaps a still more interesting possibility is the use of lime in water treatment. The following facts presented by Mr. Veatch of the firm of Black and Veatch, consulting engineers of Kansas City, will give us a concrete idea (see Rock Products, May 17, 1924). The urban population of the United States is in the nieghborhood of 70,000,000 people and it is safe to say that the amount of water used each day is in the neighborhood of a thousand gallons per capita of which fully 75 per cent receive some sort of treatment. This represents 5,250,000,000 gallons per day and one grain of lime per gallon insures a daily use of 375 tons. A conservative estimate, however, of the daily use would be approximately five grains per gallon or 1,875 tons per day, which would amount to close to 800,000 tons annually, or approximately ten times that used at the present time. This does not include industrial purification and including this is safe to estimate that the amount can be gradually increased to over one million tons. This would be approximately two-thirds of the total tonnage of lime now going into the entire chemical industry.

The opportunities for the introduction of lime purification plants for the treatment of raw water for ice manufacture is a good illustration of the type of promotion work which can be done. There are very few plants manufacturing raw water ice in the United States which do not need a purification plant. Lime treatment is the only successful treatment and it should not be difficult to educate the ice manufacturers to this fact. In this promotion the division and headquarters organization are co-operating very closely with manufacturers of softening equipment.

If the work of Professor Withrow and Mr. Ferguson indicates that there is a possibility for the use of lime in the treatment of sewage and trade wastes, the potential tonnage involved would be considerably greater even than that involved in water purification. We mention these facts and figures simply as illustrations of what there is to be done in the way of both investigational and promotional work.

As one method of keeping lime before the public mind, we again last September, exhibited at the Chemical Exposition. Our exhibit apparently attracted considerable attention and we were one of a few exhibitors who were awarded a certificate of merit. The contacts made at such exhibits we feel are very valuable and quite frequently develop interesting information or interesting possibilities. We are gratified to learn that several manufacturers are considering individual exhibits at the next chemical show in 1925.

Meetings of various technical associations have been attended during the year. These include two meetings of the American Chemical Society and that of the Institute of Chemical Engineers.

One of the activities which has consumed a considerable portion of our time is in connection with specifications for lime for various uses in our relations with the American Society for Testing Materials. A number of the specifications which were already tentative have been passed to standard, revisions have been made in a number of the existing tentative specifications and data has been secured as the basis for the preparation of specifications for a number of other uses. We feel that we are at the present time co-operating with and securing the satisfactory co-operation of all of those organizations interested in these specifications and the indications are that future progress will be considerably more rapid than in the past.

As a part of the service which we endeavor to furnish member companies and users of lime the work of the past year has included a large number of analyses of lime and lime products, testing of limes to determine whether they pass A. S. T. M. specifications, the analysis of plasters and concretes from a number of jobs, preparation of statements in connection with freight rate investigations and a number of other such activities. We hope that the laboratory facilities will be improved so that we can render more of such service during the coming year.

In conclusion we would respectfully present the following recommendations relating to the chemical activities for the future.

1. More and better laboratory facilities, including space, equipment and help. All of you who have seen our headquarters laboratory must appreciate the fact that we are seriously handicapped for want of space.

2. Enlargement of the scope of the fellowship work including both additions to the numbers of fellowships and increases in the endowments in a number of cases.

3. Development of faciliites for supplying to the manufacturers advertising copy, or at least material for such copy, for their use in chemical and technical periodicals. It has been suggested that this might be included as part of a plan which we understand is to be proposed during the week.

4. Provision for more chemical promotion work. We feel that the work of Mr. Arthur and Mr. Burt in the Central Division has very clearly demonstrated the value of chemical field promotion and the needs and possibilities for increased activities along this line.

Fellowship Work

Space in this issue does not permit a detailed report of the research work done at the various institutions of learning. The work of Dr. W. H. McIntire at the University of Tennessee, undertaken primarily as a study of soil chemistry, has developed certain facts in regard to reactions between iron, alumina, silica and lime at ordinary temperatures, which may prove to have a direct bearing on the manufacture of Portland cement and such specially prepared hydraulic lime as those described in Rock Products, May 17, pp. 37 and 38 by Dr. C. R. Platzmann. Dr. McIntire's work may also help very materially to explain the failures of Portland cement concrete in sea water and alkali soils.

REGISTRATIONS

Henry Angel, Kelley Island Lime and Transport Co., Cleveland, Ohio; G. B. Arthur, Central Division, Chicago, Ill.

E. G. Baker, Ohio Hydrate and Supply Co., Woodville, Ohio; Wm. H. Barton, Ash Grove Lime & P. C. Co., Springfield, Mo.; Oliver Bowles, Bureau of Mines, New Brunswick, N. J.; R. C. Brown, Wisconsin Lime Manufacturers, Oshkosh, Wis.; R. P. Brown, National Lime Association, Washington, D. C.; Chas. C. Bye, Charles Warner Co., Wilmington, Del.; L. B. Burt, Central Division N. L. A., Chicago, Ill.

Mrs. H. M. Camp, Washington, D. C.; H. M. Camp, Eastern Division, Washington, D. C.; W. E. Carson, Riverton Lime Co., Riverton, Va.; C. W. S. Cobb, Glencoe Lime and Cement Co., St. Louis, Mo.; J. D. Cochrane, Jr., M. I. T. Research Laboratory, Cambridge, Mass.; Loring A Cover, Jr., Security Cement and Lime Co., Hagerstown, Md.; A. W. Cox, Security Cement and Lime Co., Hagerstown, Md.; Mrs. T. J. Curtin, Farnam Cheshire Lime Co., Farnams, Mass.; Thos. J. Curtin, Farnam Cheshire Lime Co., Farnams, Mass.

Fred A. Daboll, Charles Warner Co., Philadelphia, Pa.; John M. Deely, Tobey Lime Co., West Stockbridge, Mass.; H. Dittlinger, Dittlinger Lime Co., New Braunfels, Texas.

W. E. Emley, Bureau of Standards, Washington, D. C.

G. H. Faist, Woodville Lime Products Co., Toledo, Ohio; J. L. Faist, Woodville Lime Products Co., Toledo, Ohio; R. H. Ferguson, Ohio State University, Columbus, Ohio; G. J. Fink, National Lime Association, Washington, D. C.; L. E. Fishack, Luckey Lime and Supply Co., Luckey, Ohio; Mrs. Wm. Flaherty, Hoosac Valley Lime Co., Inc., Adams, Mass.; William Flaherty, Hoosac Valley Lime Co., Inc., Adams, Mass.; Charles M. Foote, American Lime and Stone Co., Bellefonte, Pa.; Mrs. B. A. Ford, N. L. A., College Park, Md.; B. A. Ford, N. L. A., Washington, D. C.; Mrs. W. A. Freret, N. L. A., Washington, D. C.; W. A. Freret, N. L. A., Washington, D. C.; V. M. Frey, J. E. Baker Co., York, Pa.

J. M. Gager, Gager Lime and Mfg. Co., Chattanooga, Tenn.; R. G. Greeves, Kelley Island Lime and Transport Co., Toledo, Ohio; Betty

Griffin, National Lime Association, Washington, D. C.

Russell L. Hardy, Ohio Hydrate and Supply Co., Woodville, Ohio; Mrs. C. H. Hartman, Toledo, Ohio; C. H. Hartman, Valve Bag Co., Toledo, Ohio; R. T. Hartman, Valve Bag Co., Toledo, Ohio; R. T. Haslam, Massachusetts Institute of Technology, Cambridge, Mass.; D. S. Hunkins-Willis, St. Louis, Mo.

A. H. Lauman, Pittsburgh, Pa.; Fred Legg, Eagle Rock Lime Co., Cincinnati, Ohio; George LeGore, LeGore Lime Co., LeGore, Md.; E. S. Levensaler, Rockland and Rockport Lime Co., Rockland, Me.

Mrs. A. G. McCall, College Park, Md.; A. G. McCall, Maryland Experiment Station, College Park, Md.; Milton McDermott, Knoxville Sand and Lime Co., Knoxville, Tenn.; W. H. McIntire, University of Tennessee, Knoxville, Tenn.; J. King McLanahan, Jr., Marblehead Lime Co., Hollidaysburg, Pa.; A. K. McNamara, Eagle Rock Lime Co., Eagle Rock, Va.; J. H. McNamara, Eagle Rock Lime Co., Eagle Rock, Va.; C. C. Martin, Luckey Lime Co., Luckey, Ohio; H. Mathers, Indiana University, Bloomington, Ind.; E. H. Milner, Mississippi Lime and Materials Co., Alton, Ill.; Warner Moore, Moore Lime Co., Richmond, Va.; Mrs. Wm. H. Moores, Moores Lime Co., Springfield, Ohio; Wm. H. Moores, Moores Lime Co., Springfield, Ohio; C. J. Myers, Mississippi Lime and Materials Co., Alton, Ill.

H. W. Nieman, Luckey Lime and Supply Co., Elmore, Ohio.

Edw. B. Page, Rockport and Rockland Lime Corp., New York City; Lowell B. Palmer, Palmer Lime and Cement Co., York Pa.; W. R. Phillips, American Lime and Supplies Co., Bellefonte, Pa.; Mrs. F. M. Pinnegar, Kelley Island Lime and Transfer Co., Cleveland, Ohio; F. M. Pinnegar, Kelley Island Lime and Transfer Co., Cleveland, Ohio; E. C. Porter, Vermarco Lime Co., Albany, N. Y.; J. M. Porter, U. S. Bureau of Standards, Washington, D. C.

Thos. L. Read, Kelley Island Lime and Transfer Co., Cleveland, Ohio; C. W. D. Rowe, Dunstable Lime Co., Peterborough, England.

J. W. Seay, Moore Lime Co., Eagle Rock, Va.; S. C. Shirley, Indiana University, Bloomington, Ind.; Howard Siegrist, Howard I. Siegrist, Inc., Bridgeport. Conn.; J. A. Slipher, Ohio State University, Columbus, Ohio; S. W. Stauffer, J. E. Baker Co., York, Pa.; J. W. Stockett, Jr., National Lime Association, Washington, D. C.; Wm. F. Stolzenbach, National Mortar and Supply Co., Pittsburgh, Pa.

R .C. Towles, National Lime Association, Washington, D. C.

J. E. Underwood, National Lime Association, Washington, D. C.; Mrs. J. J. Urschel, Woodville Lime Products Co., Toledo, Ohio; J. J. Urschel, Woodville Lime Products Co., Toledo, Ohio.

O. J. Vanderpool, Palmer Lime and Cement Co., New York City; H. L. Vernia, Hoosier Lime Co., Salem, Ind.

Charles Warner, Charles Warner Co., Wilmington, Del.; Irving Warner, Charles Warner Co., Wilmington, Del.; D. E. Washburn, American Lime and Supplies Co., Bellefonte, Pa.; F. J. Wertel, National Mortar and Supplies Co., Bibsonburg, Ohio; G. J. Whelan, Kelley Island Lime and Transfer Co., Cleveland, Ohio; Gordon Willis, Hunkins-Willis Lime and Cement Co., St. Louis, Mo.; F. M. Wilton, Steacy-Wilton Co., Wrightsville, Pa.; Fred Witmer, Ohio Hydrate and Supplies Co., Woodville, Ohio; D. M. Witmer, Steacy-Wilton Co., Hanover, Pa.; G. B. Wood, Rockport and Rockland Lime Corp., Rockland, Me.

F. W. Zorn, National Mortar & Supplies Co., Gibsonburg, Ohio.

City Abrogates Contract with Sand Company

THE contract of the Western Sand and Gravel Company with the city of Wichita, Kans., by which it agreed more than two years ago to fill the boulevard site on the Arkansas river between Harry and Maple streets with sand in return for the privilege of pumping sand from the river, was cancelled by the city commission recently, and suit was started against the company.

The sand company, according to Earl C. Elliott, city manager, has failed to live up to its agreement. Instead it actually damaged the river and failed to fill the grade or trim the banks. The grade was to have been filled to a width of 80 ft., making a basis for building a boulevard later.—*Wichita (Kans.) Beacon.*

New Lime Company Organized in Tacoma, Wash.

ORGANIZATION of a new company for the manufacture of lime, which will operate a plant in British Columbia and maintain its headquarters in Tacoma, was announced by a group of Tacoma business men recently. The new company, known as the Tacoma Lime Co., is capitalized at $275,000. Construction of a plant on Texada Island, British Columbia, is planned and the organizers expect to be turning out 500 bbl. of lime a day within six months. Officers of the new company are W. C. Meachan, president; H. W. Jaeger, vice-president; D. W. Meacham, secretary, and J. M. Bean, manager.—*Tacoma (Wash.) Tribune.*

New Gravel and Cement Block Plant in Michigan

WITH E. W. Dienhart of Chicago, general manager and superintendent on the ground directing operations, work is being rushed at Cement City by the Acme Concrete Products and Gravel Co. for the opening of its plant there.

The production of washed screened sand and gravel will be begun at once, and the plant for the manufacture of various concrete building materials is to be completed and in operation early this summer.

Mr. Dienhart, who spent several days here last week conferring with officials of the company before going on to take charge of the work at Cement City, has had many years' experience in the construction business. He has just resigned from a position with the Portland Cement Association with which he was identified as an authority on concrete products manufacture and in the development of markets for concrete building materials.

The officers of the company are: President, A. C. Deer, vice-president of the Peninsular Portland Cement Co. of Cement City; vice-president, Norman B. Horton of Fruit Ridge; treasurer, William H. Burnham of Adrian, and secretary, A. G. Matthes, also of Adrian.—*Adrian (Mich.) Telegram.*

Molding Sand Company to Begin Lake Shipments

CONSTRUCTION work on the Port Crescent Sand Co.'s dock at Bad Axe, Mich., is expected to be completed next week, when sand will be loaded for shipment to Detroit. At this time conveying machinery, the storage bin and other appliances will be ready for operation.

An extra crew has been working on the dock during the past two weeks.

The sand in the locality of the dock is of extra fine grade for use in casting iron.

Boats will be chartered by the sand company for shipping and it is understood that Ford Motor Co. will consume the greater part of the concern's output.—*Bad Axe (Mich.) Tribune.*

Mauch Chunk, Pennsylvania, to Have New Crushing Plant

IN a short time Mauch Chunk will have a monster first-class stone crushing plant on the top of Flagstaff mountain, 850 ft. above the Mauch Chunk & Lehighton trolley road, thus utilizing the mountains here for the benefit of humanity. The project is the conception of J. Waterman, a director of the trolley company. The rock has already been tested and proved to be the hardest of its kind. It is proposed to build chutes down the steep mountain side direct to the cars on the railroad tracks.—*Philadelphia Inquirer.*

New Calcium Arsenate Plant of Montgomery, Ala.

COMMISSIONER of Agriculture J. M. Moore expressed himself as most favorably impressed with the new calcium arsenate plant recently established here, following a trip of inspection over the plant. "I believe that the establishment of the plant has already had an effect in holding down prices," Commissioner Moore stated.

Speaking of calcium arsenate for boll weevil control, Commissioner Moore stated that the department recommends it above everything else for that purpose and that it is well past the experimental stage as a means for fighting the weevil.

It is claimed on behalf of the calcium arsenate being produced at the plant here that it does not burn foliage of cotton plants, owing to the method of its manufacture.—*Montgomery (Ala.) Journal.*

Oklahoma Glass Plant to Resume

J. W. DeCAMP, president of the DeCamp Consolidated Co., has announced the purchase of the Mid-West Glass Casket factory with plants in Streator, Ill., Chattanooga, Tenn., and Santa Monica, Calif., and the moving of the company's headquarters from New York City to Muskogee, Okla.

DeCamp also announced that the factory in Muskogee would be reopened, new machinery installed, including oil burners, and caskets manufactured. The factory, which is two miles northeast of the city, has been closed since 1920. It was closed because of the company's inability to get gas for fuel.

Within the next 60 days DeCamp expects to put the plant in operation manufacturing glass caskets only.

After two years of operation, war time prices forced the Mid-West company to close and since that time the Muskogee plant has been the object of much legal procedure.

The general offices of the company were opened on the fifth floor of the Muskogee National bank building. DeCamp will move his families here. Other directors are J. P. Miller, J. R. Dudding and Thomas Wheelan. —*Muskogee (Okla.) Phoenix.*

Southwestern's New Ohio Portland Cement Plant

THE Southwestern Portland Cement Co. will erect a $2,500,000 plant at New Osborn, Ohio, opposite the Big Four railroad station at that point. Preliminary work on the ground, a 600-acre site, began May 1. The plant will have a capacity of 6000 bbl. a day.

The company is now operating two plants, one at Victorville, Calif., and one at El Paso, Texas. The Dayton plant will be larger than either of the other two, the Texas plant having a capacity of 3600 bbl. a day, the California plant 5000 bbl.

Dayton was chosen for location of this plant following an exhaustive survey of this and many other locations, Carl Leonardt, president of the company, said. No previous announcements of the entrance of this company here has been made, Mr. Leonardt said.

Three chemists representing the company have been on the ground investigating the materials since November. Their work was facilitated by the University of Dayton, which put laboratory facilities at the disposal of the chemists so that all analyses were made here.

Mr. Leonardt, whose home is in Los Angeles, Calif., has been in Dayton for three months giving the problem his personal attention. O. J. Binford, secretary of the company, formerly in charge of the El Paso plant, has taken up his residence and he will be the Dayton representative of the company.

Cements manufactured by the company at its other plants are known as "El Toro" and "Victor." No trade name has been announced as yet for the Dayton products.

The company, it is stated, has the lowest capitalization of any cement company in the United States, has no bonded indebtedness and no stock for sale. It is doing its own construction work here, using concrete for the most part. The factory will be of fireproof construction throughout.

Besides railroad sidings for rail transport, the company will install special facilities for accommodation of trucks hauling for the local trade.—*Dayton (Ohio) News.*

Protests Against Cement Import Duty

I. A. STUB & CO., San Pedro importers, in a letter to the Los Angeles Chamber of Commerce, requested that body to withdraw its support in the contemplated petition to be put before congress asking for a duty on foreign portland cement now coming into Los Angeles harbor.

The letter states that most of the imported cement comes from Belgium, which purchases approximately $9,000,000 worth of Southern California commodities annually, and that charging an import duty would greatly curtail trade between Belgium and Los Angeles.—*Los Angeles Daily News.*

Huron Portland Cement Company to Build New Plant at Wyandotte, Mich.

IN addition to its present facilities for serving the construction industries of Detroit, the Huron Portland Cement Co. also operate the Wyandotte cement plant in conjunction with the Michigan Alkali Co. at Wyandotte. The Wyandotte plant has been in operation for a great many years and its output of 2,000,000 sacks is also devoted to serving the construction industries of Detroit and vicinity.

In addition to the plant now operating at Wyandotte, the Huron company, upon completion this month of the enormous construction program that has been carried out at Alpena, have started construction of an entire new plant at Wyandotte, which will be operated in addition to the present plant.

The new plant will be the last word in modern, efficient cement plant design, and will have a daily producing capacity of 20,000 sacks. It will be completed ready to operate January 1 next.

This plant is being built as a reserve producing unit to further fortify the future needs of the distributive requirements of the company's activity, the policy of the company being to create these additional producing facilities a substantial period of years in advance of the actual necessities of present day demands, and will only place them in operation as rapidly as the marketing conditions can absorb the new output and thereby justify the capital investment required.

The strength of the new Wyandotte plant, as in the case of the present Wyandotte plant, aside from its adantages of improved design and more modern equipment, lies in the fact that the process upon which the plant is predicated is in its entirety a utilization of otherwise absolute waste material from the great Alkali works at Wyandotte, and it is predicted that this new Wyandotte plant will unquestionably be the lowest-cost producing cement plant in the world.

The ownership and management of the Huron Portland Cement Co. and the Wyandotte Portland Cement Co. is entirely local, and the personnel of its officers is made up of some of the recognized industrial leaders of the community as follows: John B. Ford, president; E. L. Ford, vice-president; John W. Boardman, vice-president; S. T. Crapo, secretary-treasurer.—*Detroit Free Press.*

Concrete Fence Posts

POSTS which have been on test in an Iowa experiment station for over eight years, made of concrete and reinforced, show practically no signs of depreciation. The tests showed that the posts made from graded aggregate, although requiring less cement, possessed greater ultimate strength than posts made from bank-run material.

White Cement Plant Announced for Southern California

CONSTRUCTION of a $1,000,000 cement plant is soon to be started at a site on the San Diego & Arizona railway between Dixie and Coyote Wells, near San Diego, Calif., by the Columbia Cement Co., according to Fred A. Ballin, president of the company, which has its headquarters in Los Angeles. Ballin formerly was president of the Monolith Portland Cement Co.

The Columbia company, he stated, had purchased the property of the Southern California Marble Development Co., consisting of 25,000 acres in Imperial county, for $145,000, and will manufacture at the new plant a white cement from the marble deposits on the land acquired.—*San Diego (Calif.) Tribune.*

International Cement Corporation Report for First Quarter of 1924

INTERNATIONAL Cement Corporation reports for the first quarter of 1924 net income of 442,013 after expenses and charges, equal, after allowing for accrued preferred dividends, to $1.14 a share on the 364,167 shares of common stock outstanding. Net income for the corresponding quarter of 1923 was $460,310 or $1.19 a share on the common stock and net earnings for the December 31, 1923, quarter were $570,034 or $1.50 a share on the common stock.

Report for the March, 1924, quarter compares as follows:

	Quarter ended—		
	Mar. 31, 1924	Dec. 31, 1923	Mar. 31, 1923
Gross sales	$2,961,597	$3,352,530	$2,641,314
Discount and allowance, etc.	529,640	599.352	456,541
Mfg. costs	1,202,453	1,305,792	1,050,846
Depreciation	182,501	254,208	179,633
Ship'g, selling and admin. exps.	504,079	490,316	400,501
Net profit	$542,923	$702,860	$553,792
Miscel. income	195	158.883	6,771
Total income	$543,118	$861,743	$560.563
Int. charges and financial exps. and res. for Fed. taxes, etc.	101,105	291,708	100,353
Net income	$442,013	$570,034	$460,210

Holger Struckman, president, in remarks to stockholders says:

"During the first quarter, domestic shipments were somewhat curtailed due to unusually inclement conditions. The installation of a third kiln at the Houston plant was completed in March and a similar installation at the Cuban plant was completed in April. Both of these plants are now operating at capacity and this additional production will be reflected in the results for the balance of the year. This enlargement of the Kansas plant is expected to be completed toward the close of the current quarter."

International Cement Corporation declared the regular quarterly dividends of $1 a share on the common and $1.75 a share on the preferred stocks, payable June 30 to stock of record June 15.—*Financial America (New York).*

A Blasting Problem—and Various Solutions

Wilsons (N. Z.) Portland Cement, Limited, Wants Suggestions from American Quarrymen

THE EDITORS: Some time ago, you were good enough to give the writer an interview, and you may recollect among other subjects, our own particular quarry problem was referred to. You were also good enough to suggest that if this problem when set out in definite shape appeared likely to be of general interest to your readers, you would submit it to some of them for a solution.

A tracing showing the general contours of the quarry tract and the development work to date is attached.

The output now required is 500 tons per day, but the demand will shortly rise to 900 tons and the quarry will have to be developed to supply 1300 tons per day within three years.

The rock is an argillaceous limestone with a general strike N25°E and dipping 18° to N.W. but in addition to fairly distinct lamination and joint planes, numerous faults are present. These combined make it inadvisable to work a quarry "with the lay of the ground" when the face is high and vertical. The rock is considerably softer and weaker than the Lehigh Valley cement rock and breaks readily.

Until recently a blast-hole drill was used in the "old cut" and a vertical face some 200 ft. long and running from 100 ft. to 160 ft. high was developed. This is indicated on the tracing as "edge of old cut." On account of the construction of a government railway, which it became necessary to cross below grade, the quarry and floor had to be lowered, the portion marked "floor of new cut" shows the progress of the work to date.

The overburden on the whole is light, but a heavier deposit on the left-hand side at the entrance to the quarry initially discouraged work in this direction. On the other side the presence of the stream prevents extension. The result is the high and short face indicated as "edge of old cut." The heavier overburden referred to, while inconvenient is not sufficient to discount any scheme of development calling for extension in that direction.

At present, steam shovels, ¾-yd. and 2¼-yd. dipper capacity are installed together with a Loomis blast-hole drill and the usual jackhammers and compressor.

The problems before us are:

1. Length of face required to enable 1300 tons per day to be loaded regularly. The deposit extends at least 1500 ft. to the left and back into the hill a similar distance.

2. Best direction in which to extend the quarry, keeping in mind that due to height and small tonnage, the face advances slowly and giving consideration to loading and transportation track requirements.

3. Best method of working quarry while providing safe working conditions for shovel and train crews. Assume face at least 200 ft. high. Should present method with well-drill holes be extended, or should some method of tunnel blasting be adopted?

Our inclination is to maintain for the present the vertical face, possibly using somewhat more explosive than the most economical blasting practice indicates; but sufficient to throw the apex of the broken pile away from the face and produce reasonably safe working conditions. Due to the short face, it is felt that it would be difficult at present to maintain the supply of rock by means of tunnel blasts, but it has been suggested that this method could be utilized to extend the quarry face to the left, leaving the final squaring down to be done with jackhammers..

Wilsons (N. Z) Portland Cement Ltd.
(Signed) F. N. RHODES,
Assistant Works Manager.

The Role of Gypsum in Setting of Cement

A PAPER on hydraulic hardening of cement, regarded as a chemical colloidal problem, read at the 45th Congress of the Association of German Portland Cement Makers, comprises some observations on the action of gypsum, an improver usually employed in making Portland cement. According to the author, Dr. Hans Kuhl, of Berlin Lichterfelde, the influence of gypsum on the time of setting, hitherto a mystery, can be explained by the action of the aluminous ions. According to his theory, we must admit that gypsum does not delay but, on the contrary, accelerates setting, as it produces a dispersive solution from the point of view of molecules. Its presence then must contribute to increase of concentration of the ions and favor gelatinisation. Hitherto the greatest difficulty has been experienced in explaining the action of gypsum in cement making. It was at first supposed that gypsum retarded setting by forming a film around each grain which prevents access of water. This theory, however, cannot be supported, because it is not possible to admit that gypsum, which is soluble, could produce an insoluble film on the grains.

When we consider the question more attentively we may be led to conclude that gypsum exerts an action because it is dissolved, and that in solution it has a certain influence on the phenomenon of hydration.

Thus it might appear that cement is the less soluble in a gypseous water, according to the greater degree of saturation of this water, and that then the difficulty with which the grains dissolve results in an increase of the time of setting.

Nevertheless this explanation cannot be accepted either, for according to this theory even a very small quantity of gypsum would cause considerable delay; practically it represents 2 to 3% of the cement. When we remember that in ordinary setting tests, the cement is mixed with a maximum of 30% water, the amount of gypsum needed to transform the water into a gypsum saturation would only be 1/15 part per cent, and, as this water cannot absorb gypsum beyond saturation point, it is hard to understand how any quantity of gypsum more than 1/15 part per cent could yet exert an influence. Now every professional worker knows that it is impossible to produce such an effect with so small an amount of gypsum, that really necessary being much greater. An endeavor might be made to overcome this theoretic difficulty and explain the necessity of this larger quantity of gypsum, by reasoning as follows:

To exert an action, the gypsum must not only give a saturated solution, but this last must also be produced with sufficient speed and for this there must be a considerable excess of gypsum in the cement. This explanation might elucidate the fact that numerous cements are not perceptibly delayed in setting by addition of 1% gypsum, but 1.5 to 2% causes a lagging. Thus we may say that, in such cases, constitution of a saturated solution with 1% gypsum does not take place quickly enough, and that there is sufficient rapidity when the cement contains 1.5 to 2% gypsum.—*Rev. Mat. Constr.*

Use County Jail Prisoners to Run a Kansas Quarry

THE county is getting a goodly amount of rock turned out of the quarry east of town by working the inmates of the county jail there.

The practice of working the jail is a good means of keeping the men employed while their jail sentence is being worked off. An added inducement to the men is the fact that each day they work in the quarry is counted as two days on their jail sentence.

The men, generally about 12, are taken to the quarry each day in a truck, returning to the jail for dinner, and quitting work about 4:30 o'clock in the afternoon. They are furnished with gloves and overalls while working.—*Topeka (Kans.) Capital.*

[The above is one of the many instances of the way the regular producers of road materials are "picked on" by state, county and municipal authorities. If jail inmates were set to laying brick or doing carpenter work, we expect that a howl would go up from every bricklayer's and carpenter's union in the land.—THE EDITORS.]

Louisville Molding Sand Business Active

AN exceptional active demand for sand, gravel, limestone rock, and fertilizer filler is reported by officials of the Ben Humpich Sand and Gravel Co., located at Hancock and Marrett avenues, Louisville, Ky. This is one of the oldest companies in the sand and gravel business in Kentucky.

The historic Old Fort Hill, with which every native Louisvillian is well acquainted, yields many tons of quality sand for the Humpich Sand and Gravel Co. This same concern owns pits at Floyd and Brandeis streets and at Hancock and Marrett avenues. These for years have given the company its output of sand, which in turn has been distributed to industries and foundries al over the United States.

The Humpich company spreads out over a number of acres of ground, and has a large amount of stock, carts, wagons and trucks which are necessary to the proper conducting of a business which has been expanding constantly for years. Matilda Humpich, manager of the company, reports that not only has sand been furnished to nearly all the foundries in Louisville, but to some of the largest foundries south of the Ohio river.—*Louisville Courier-Journal.*

Booklet on Westinghouse Insulating Fabrics and Papers

THE Westinghouse Electric and Manufacturing Co. has recently published a new booklet, known as Folder 4532-A, dealing with Westinghouse Fabrics and Papers for insulating purposes. All the forms of treated and untreated fabrics, papers, sleeving, tapes, cord and thread manufactured by the company are fully described in the booklet and their principal applications given. For the purpose of easy reference, tables have been included setting forth in tabulated form the thickness, width, approximate weight, and size of the various materials described. For the treated fabrics and for the untreated fabrics and papers, approximate breakdown voltages have been given for each material under these classifications.

The materials described in this folder are those used in the manufacture of Westinghouse electrical apparatus and made available to the general trade. The booklet is of interest to all users of insulating material.

New Open-Hearth Refractory Material Sought

IN connection with the study of open-hearth refractory materials, being undertaken by the Department of the Interior at the Ceramic Experiment Station of the Bureau of Mines, Columbus, Ohio, experimental work has been started which has as its aim the production of a high alumina refractory using a kaolinitic bauxite as the raw material. There are large deposits of bauxite high in silica that have found a very limited field of usefulness which it is hoped can be utilized to produce a less acid refractory than silica and which will at the same time have a higher fusion temperature. When such material is fused or highly sintered, it can be made into a brick which will be practically free from the high shrinkage characteristic of bauxite brick burned at the ordinary kiln temperatures. The mineralogical composition aimed at is a mixture of sillimanite and corundum together with the eutectic formed between these two minerals.

Magnesite Production in 1923

THE Department of the Interior announces through the Geological Survey that statistics compiled by J. M. Hill show that the magnesite material marketed in the United States in 1923 from domestic mines was equivalent to 147,250 short tone of crude magnesite, valued at $1,103,700, an increase of 164% in quantity and 93% in value as compared with the quantity marketed in 1922. As the value is based on the price of crude magnesite f.o.b. mines and as about 50% of the output—a much larger percentage than usual—was made in the state of Washington, where the operators place a low value on the crude uncalcined rock, the increase in value in 1923 was low as compared with the increase in quantity.

Eight producers of magnesite in California in 1923 were operating at 11 localities in Napa, San Benito, Santa Clara, Stanislaus, Tulare, and Tuolumne counties. In Washington the output came from three properties near Valley and Chewelah, in Stevens county.

The reports of the Bureau of Foreign and Domestic Commerce show that the magnesite material imported for domestic consumption in 1923 amounted to 5182 short tons of crude magnesite, valued at $44,081; 10,928 tons of caustic calcined magnesite, valued at $306,610; and 61,726 tons of dead-burned magnesite, valued at $707,383. These figures appear to indicate that the foreign producers can mine and calcine magnesite more cheaply than the domestic producers. No crude or calcined magnesite was exported.

The table shows that the domestic producers regained in 1923 some of the market they lost in 1922, largely, probably, because of the protection afforded by the new tariff act. Operators report, however, that even with the present tariff it is almost impossible to compete with either dead-burned or caustic foreign magnesite in the Eastern markets on account of the great cost of production and high freight rates.

Seek New Uses for Slag

BETTERMENT of present methods of utilizing the slag produced as a waste product of blast furnaces, and research looking toward the development of new methods of using it were discussed at a conference of the National Slag Association held at the Bureau of Standards, Department of Commerce, recently. In addressing the conference, P. H. Bates of the Bureau of Standards called attention to the fact that slag is now used in Europe for making "Eisen portland cement" which consists of about 35% of ground slag and 65% of portland cement. He expressed the opinion that such use would ultimately develop in this country. Eisen cement is nearly as strong as portland cement, he stated, and is also thought to be more resistant to attack by sea water and by alkali.

Following Mr. Bates, J. C. Pearson, chief of the bureau's cement section, told the conference about tests made at the Bureau of Standards on the properties of concrete in which slag is used as aggregate. The bureau finds that if the usual proportions are adhered to the concrete made with slag is less workable than that made with gravel, and is not so easily handled, but this difficulty can be avoided by using a larger proportion of sand. Strength tests are now under way, and results are expected by the middle of the month. The slag concrete is found to fill about 6 or 7% less space for the same volume of aggregates as compared with gravel concrete, Mr. Pearson stated.

There are 20,000,000 tons of slag produced annually in the United States, Mr. Pearson said, and it sells for a small fraction of a cent per pound. It is usually not handled by the steel industry, but is sold by them to independent concerns who make it into useful products.

The meeting was also addressed by Mr. McCullough of the Chamber of Commerce of the United States and R. M. Hudson of the Division of Simplified Practice of the Department of Commerce. Among the members of the association present were the president, C. L. McKenzie, president of the DuQuesne Slag Products Co. of Pittsburgh, and the secretary, H. J. Love, of Cleveland, Ohio.

Review Gravel Rates

IT is reported that on request of the W. G. Mitchell Lumber Co., Demopolis, the Interstate Commerce Commission has included Alabama rates on gravel among matters included in the famous Meridian rate case order that has been reopened for further discussion.

MAGNESITE (EXPRESSED AS CRUDE) CONSUMED IN THE UNITED STATES, 1918-1923, IN SHORT TONS

Year	Domestic Production	Imports	Apparent Total Consumption	Proportion of Consumption Supplied by Domestic	Foreign
1918	231,605	43,530	275,135	84	16
1919	156,226	25,321	181,547	86	14
1920	303,767	63,110	366,877	83	17
1921	47,904	65,569	113,473	42	58
1922	55,790	217,861	273,651	26	74
1923	147,250	150,490	340,829	43	57

Comments from Rock Products Readers

Letters and Extracts of Letters to Rock Products Editors

Tests of English Cement

By G. W. FISHER
Sales Manager, Ship Canal Portland Cement Manufacturers, Ltd., Ellesmere Port, England

IN your issue of the 17th November, we notice a paragraph to the effect that the importations of Swedish, English and German cements recently landed on the Pacific coast will not pass the American Specification.

We should like to point out that this can have no application to the shipment of 7,700 tons "England" Brand Portland Cement made by us to Los Angeles in July last.

In support of this we enclose copy of letter—in its entirety—received from a firm of contractors in Los Angeles, together with test sheets showing the result of a series of tests on this consignment carried out in accordance with the American Society Specifications.

JAHN & BRESSI
315 S. Broadway
Los Angeles
November 13, 1923.

Ship Canal Portland Cement Manufacturers Ltd.
Liverpool, England.
Gentlemen.

It gives me pleasure to state that we are using approximately 50,000 bbl. of your "England" brand cement on contracts we have with the City of Los Angeles. Up to date the cement has given satisfaction in every way.

As you know, we purchased this material indirectly through a large material dealer. We would be very glad to know if you care to ship more of this cement to this country and what is the best price you could make us.

For your information we have done considerable work on the Pacific Coast, the last two contracts we completed being for $700,000 and $500,000 respectively, in Seattle, Wash.

Thanking you in advance, we are,
JAHN & BRESSI,
(Signed) N. F. Jahn.

Another Concrete Tie Possibility

THE EDITOR: In February 23 number of ROCK PRODUCTS there is a description of a concrete railway tie, designed by F. C. Shearer.

In looking up the origin of railways I find the following. "The origin of these now vast undertakings is traced to a contrivance for simplifying the transit of coal from the mines in Northumberland and Durham to the place of shipment on the Tyne and Wear. The invention consists of a double parallel line of wooden beams or trams fixed to the ground, and furnished with flanges to prevent the wheels of vehicles from slipping aside. Along these flanged beams wagons were drawn by horses with such comparative ease, that instead of a load of 17 cwt. by a common road, a load of 42 cwt. could now be drawn by a single horse."

You will note that, what attracted attention is the loads they could haul with the same tractive power. A railway tie to replace the wood tie to attraction attention, must increase the efficiency of the railways.

The Walker steel-concrete tie and steel elastic rail hitch will attract attention for the same reason the wooden trams did. More tonnage with the same tractive power and at faster speed than is possible over steel rails tacked to wood ties.

The enormous saving in operating trains over steel rails properly connected to steel-concrete ties will within a reasonable time pay for the entire change from wood to steel concrete ties.

We will be pleased to take the matter up with any responsible stone-crushing company as an outlet for their surplus material.

The Walker tie is not an idea—it is the result of 50 years of good hard contact with the very things that will fit a man to develop a railway tie and we are offering the Walker tie now as a complete thing that can go into any railway track and make it what it should be and provide live rails to operate trains over. W. F. WALKER.

Macungie, Pa., March 12, 1924.

Works Analyses and Tests on Samples drawn by R. H. Harry Stanger, Esq., from 180,000 Bags of "ENGLAND" Brand Portland Cement shipped per s.s. "Mongolian Prince," July 24th, 1923.

Sample marked	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Chemical Composition.	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Silica	22·48	22·68	22·10	22·64	21·60	21·53	22·05	21·93	22·32	21·91	21·78	21·63	22·44	22·02	23·24	22·19	21·94	22·50	22·16	21·73	22·31	22·03	21·97
Insoluble Residue	0·23	0·32	0·28	0·32	0·28	0·25	0·25	0·25	0·32	0·24	0·24	0·27	0·30	0·28	0·32	0·25	0·30	0·28	0·28	0·23	0·25	0·25	0·25
Alumina	6·07	6·21	6·38	6·24	6·60	6·16	6·58	6·35	6·61	6·44	6·49	6·61	6·31	6·59	6·60	6·61	6·34	6·42	6·21	6·60	6·18	6·89	6·88
Ferric Oxide	3·01	2·87	2·94	2·94	2·97	3·08	2·88	2·97	3·01	2·94	2·97	2·87	2·91	2·87	2·88	2·87	2·88	2·94	2·87	2·97	2·94	2·97	2·94
Lime	63·32	63·22	63·18	63·12	62·86	63·04	63·42	63·60	62·78	63·26	63·26	63·22	62·96	63·02	63·36	63·40	63·22	63·32	63·46	63·16	63·52	62·96	63·24
Magnesia	2·32	2·12	2·39	2·35	2·68	2·10	2·10	1·92	2·32	2·59	2·61	2·61	2·10	2·32	2·05	2·14	2·03	2·05	1·93	2·55	2·26	2·54	2·61
Sulphuric Anhydride	1·37	1·32	1·37	1·27	1·36	1·36	1·32	1·43	1·31	1·35	1·46	1·40	1·31	1·41	1·31	1·31	1·42	1·27	1·44	1·37	1·30	1·36	1·31
Water and Carbonic Anhydride	1·04	1·10	0·92	1·01	1·08	0·90	1·10	0·98	1·04	1·18	1·02	1·15	1·21	0·99	1·02	1·21	1·06	0·96	1·10	1·02	1·04	0·96	1·01
Alkalies and Loss	0·11	0·16	0·24	0·11	0·37	0·68	0·30	0·07	0·29	0·23	0·22	0·24	0·46	0·30	0·22	0·11	0·81	0·21	0·55	0·35	0·20	0·14	0·29
	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00	100·00
Specific Gravity	3·185	3·165	3·175	3·165	3·165	3·165	3·165	3·165	3·175	3·165	3·175	3·165	3·185	3·165	3·170	3·175	3·175	3·175	3·175	3·165	3·170	3·165	3·170
Fineness—																							
Residue on 200 × 200 mesh seive	12·1	12·6	12·6	12·4	12·0	12·3	12·3	12·2	12·0	11·9	12·2	11·6	12·6	12·5	11·8	12·2	11·2	12·2	11·4	11·6	12·9	12·2	12·0
Soundness	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.	O.K.
Setting Time—																							
Initial (Mins.)	135	140	150	140	130	135	120	140	150	150	130	120	120	125	140	125	135	150	130	130	130	120	130
Final (Mins.)	265	270	290	255	250	280	270	290	295	290	250	245	240	275	275	260	250	300	270	240	275	245	265
Tensile Strength—																							
7 days (3:1) lbs. per sq. in.	357	346	341	358	379	356	356	369	359	373	380	370	363	375	376	356	365	379	371	375	346	371	380
28 days (") do.	443	442	420	455	490	430	430	461	430	446	490	440	440	438	445	434	426	456	448	471	423	436	480
Compressive Strength—																							
7 days (3:1) lbs. per sq. in.	2987	3070	3360	2987	3443	3320	3110	3278	3153	3278	3400	3236	3110	3153	3153	3236	3236	3320	3360	3360	2987	3360	3236
28 days (") do.	4428	4400	4760	4400	4980	4644	4400	4720	4554	4803	4980	4890	4403	4803	4803	4803	4554	4803	4600	4890	4600	4890	4890

The above Analyses and Tests have been carried out in accordance with the Specification of the American Society for testing materials, with the exception that Leighton Buzzard Sand was used for the Tensile and Compressive Strength Tests.

HENRY J. GILLETT, *Chief Chemist.*

Rock Products Literature

Cement, Limes and Plasters

CEMENT LIMES AND PLASTERS: Their Materials, Manufacture and Properties. 8vo. 655 pp. 158 figures and 6 folding plates. Cloth. $6.50. John Wiley & Sons, New York.

The first edition of Major Eckel's book long ago proved its value. In this second edition he has added material drawn from his experience in Europe during the war, when he was in charge of the operation of plants furnishing construction supplies for the American Expeditionary Forces.

The reviewer can testify to the value of this book as a reference work having had occasion to consult it frequently and usually finding the needed information. Since there are so many materials treated the text upon each is necessarily limited, but, the essential facts about each of these materials are all included, and the compact and orderly arrangement permits them to be found readily. Especially valuable are the chapters on hydraulic lime, grappier cement and puzzolanic cements, which are usually handled in a rather sketchy manner in American works.

The introductory matter on elementary geology and chemistry as applied to the subject has been properly compressed in the first 17 pp. Gypsum is given 73 pp. As this material is continually growing in importance the chapter on the resources of the country is of especial interest. The manufacture of plaster is taken up in detail with abundant tables showing such things as the effect of temperature and time on calcination. Rotary calciners, both American and foreign are discussed.

Lime takes up almost a fourth of the book (134 pp.) but this is no more than the subject demands. After discussing the chemistry of lime burning the design of kilns is taken up and the evolution of the modern lime kiln shown and various kilns illustrated.

In discussing practice Emley's interesting findings on lime kiln efficiencies are given in table form, and there is a great deal of data on cost of lime manufacture at different periods. The discussion of hydration of lime is somewhat scanty and the continuous type of hydrator is not even mentioned. Sand-lime brick manufacture is well treated, however, and the burning of magnesia and the manufacture of magnesia bricks.

Hydraulic lime is little made in this country, but it ought to be, at least to the extent that it is now imported, so the chapters on the hydraulic lime manufacture at Teil, France, and the making of grappier cement have an especial interest. They are drawn from the author's experience while he was in charge of the Teil plant.

Natural cements (and their making is by no means a lost art in the United States) and the puzzolanic and slag cements occupy a good sized portion of the book. One important part of this section is the discussion of the properties of these cements and a comparison of the strengths, both of neat cements and mortars, with portland cement. The author takes the ground that there is a real field for natural, puzzolanic and slag cements as well as for hydraulic lime, inasmuch as their cost of production is lower than that of portland cement and there are many cases in which their lower resistance to compression or slower rate of setting is not of serious importance. And he points out that they find such a field in Europe.

Portland cement, since it is the most important of all mortar making materials, naturally gets the largest allowance of space in the book, 307 pp. The whole subject of portland cement manufacture is thoroughly covered from the sampling of deposits of raw material through the quarrying and crushing and on through the clinker burning and grinding; a book in itself. As in the other chapters, European as well as American practice has been included and the abundant tables and charts giving the properties of cement and cement mortars have been drawn from European as well as American sources.

The great value of this book is in its breadth and scope. We have become so absorbed in a single mortar making material that we have forgotten that there are others, the value of which has been proven by years and sometimes centuries of use. Major Eckel has given these a fairly proportionate treatment, and made his book a repository of information that will make it invaluable, not only to the cement manufacturer and user but to engineers, architects, manufacturers of sand lime brick and concrete products.

But while acknowledging this value, it must be admitted that the book has a serious defect in the absence of all references to current literature on the subjects discussed. For although the book shows evidence of extensive revision it contains no references later than about 1914 and the equipment and machinery illustrated is of a vintage much older than that. For that reason the book is a distinct disappointment to experienced operators well-posted in the modern technology of the rock products industries. Of course, this does not detract from its value as a source of fundamental information on the chemistry and basic manufacturing processes of the industries.—E. S.

At least twice the editors have announced this page as a regular feature—so we won't make any promises this time. The fact is the editors are so busy hurrying from one end of the country to the other that they have been negligent in noticing and reviewing many books of interest to our readers. We hope to do more reviewing this summer. Publishers and the Geological Surveys of the various states have been very generous in sending us review copies and we will give space to these reviews as fast as we can.—The Editors.

Technology of Gypsum

BY far the most valuable contribution to the scanty literature on the preparation and uses of gypsum is the 558-pp. report of the Iowa Geological Sruvey Volume 28 ("Annual Reports for 1917 and 1918 with Accompanying Papers" is the exact title). After a few short chapters on other mineral resources of the state comes a monograph "Gypsum: Its Occurrence, Origin, Technology and Uses" by Dr. Frank A. Wilder.

Dr. Wilder needs no introduction to the gypsum industry because he has been a prominent producer (president of the Southern Gypsum Co., North Holston, Va.) for many years. His introduction to the industry goes back to nearly 30 years ago when he was a teacher of science at the Fort Dodge, Iowa, high school. Subsequently he was Assistant State Geologist of Iowa and is thoroughly familiar with the geology of gypsum as well as with its manufacture into a great variety of modern products.

Chapter headings include: Physical and chemical properties of gypsum; description of important deposits of gypsum in the United States and foreign countries; origin of gypsum and anhydrite; general description of Iowa gypsum areas; stratigraphy of the Iowa gypsum areas; history of the gypsum industry; physical and chemical characteristics of Iowa gypsum; technology of gypsum and gypsum plasters; use of gypsum in portland cement; gypsum in agriculture; other uses of raw gypsum; chemical characteristics of calcined gypsum; physical properties of calcined gypsum; uses of calcined gypsum; composition and properties of gypsum plasters; gypsum blocks; gypsum plaster board and gypsum wallboard; structural gypsum; hydraulic gypsum and Keene's cement; retarders and accelerators; hardening and coloring of gypsum and gypsum plasters; statistics; bibliography.

In a later issue we will attempt to give a rather more extensive review.—N. C. R.

Editorial Comment

The Missouri Situation

The unfortunate situation in Missouri, in respect to the purchase of highway material by the state, seems to have grown out of a misunderstanding of the production of cement, sand and stone and what we think is fair to describe as obstinacy on the part of the highway engineer and the commission.

When Mr. Piepmeier, the state highway engineer, first went to Kansas City he asked one of the leading producers the price of crushed stone. On being told that it was $1.65 a ton he said with some heat that the price was "outrageous," and that the state would never pay it. Reference to ROCK PRODUCTS market reports shows that crushed stone sells for more than $1.65 at several places in the United States, and for reasons that do not show on the face of the reports. The producers about Kansas City have very difficult and expensive operations and are certainly justified in asking a price covering the cost of production under conditions where they must quarry from thin ledges separated by strata of shale, clay and cherty rock, that has to be sorted out to produce material to pass highway specifications.

A reasonable business man who had so much material to purchase would have brought the producers together and found out why prices were out of line with prices elsewhere and under what conditions a substantial reduction in price could be made on account of large tonnage and long-time contracts. The producers were willing and still are willing to make concessions, but when bids have been asked for, the conditions of bidding have been such that many producers did not feel justified in bidding at all. Meanwhile, the state has been buying material at the regular market price.

Inspection is an important factor. The highway material specifications of Missouri are rigid. If they were held to exactly, the state would find it impossible to obtain materials in some sections of the state at a reasonable price. So, the inspection has, on the whole, been reasonable. However, as is usual when the personal equation is the deciding factor, material has been turned down by one inspector that another was quite ready to pass; and in some cases inspectors have said frankly that the specifications were kept rigid so that they could turn down material if they "did not like the way the quarry was run."

One producer, speaking before the highway commission, summed up the matter when he told the commissioners that their efforts seemed to have been directed *not* toward securing material for the state highway at a reasonable price, but toward refusing to buy material so far as they could, presumably to justify the state itself in going into the production of material. Apparently, this was the aim of such ridiculous propaganda as the "twenty-cent sand" story. The state already has been put into the production business to a considerable extent by the highway commission; it has produced some stone, it is, to all intents and purposes, a partner in a cement plant, and it is in the sand business, buying its crude material from a dredging company. From such information as we can gain, the state has made no money by its semi-socialistic ventures and stands to lose something in the long run.

Every engineer and architect knows that it is not good business nor in the interests of good and honest construction for the purchaser and user of construction materials to have a financial state in their manufacture. Under such conditions it is not humanly possible to enforce specifications and the acceptance of poor material is a foregone conclusion.

ROCK PRODUCTS has no interest in the Missouri situation except to see that producers of cement, sand and crushed stone are given a square deal, and our investigation has convinced us that the producers in this instance have not had a square deal. Furthermore, we know that propaganda and the half-truths put out by the publicity department of the Missouri state highway commission have worked real injury on producers, not alone in Missouri, but throughout the whole United States, by placing them in a false light before the public and the buyers of their products.

Cement Safety Trophy

It is an index to the highly developed state of the portland cement industry that the interest of those who attended the spring meeting at Los Angeles was focused on the award of the safety trophy. As industries go, cement making is not particularly dangerous. One plant ran five and one-half months without the loss of a single man-hour from accidents. But to make the industry *comparatively* safe is not enough for the men in charge of plant operations. They want to make it entirely safe. A study of the accident record shows that they are well on their way to this end. No fatality (which counted as 6000 man-hours lost) is shown in the record of the 99 plants which reported. The greatest loss was 4327 man-hours. As compared with this a third of the plants showed losses of less than 100 man-hours. Reading the records of accidents in the daily papers one would say that a man was far safer working in one of the well-conducted cement plants than he would be making his way through traffic in the downtown district of a big American city and the records of accident insurance companies would probably show that he was far safer than the woman who is working about the house.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert,
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning May 26:

Central Freight Association

8529. Crushed stone. White Sulphur, Ohio, to Ohio. Present, sixth class; proposed, 80 cents to Harvey, Marion, Lynn, Waldo, Norton and Troyton, Ohio; 90 cents to Omar, Attica Junction, Attica, Carrothers, Chatfield, Ridgeton, Brandy Wine, Bucyrus, Monnette, Tobias, Hoover, Galena, Sunbury, Big Walnut, Condit Centerburg, Mt. Liberty, Bangs and Mt. Vernon, Ohio; $1 to Sandusky, Weyers, Parkertown, Bellevue, Flat Rock and Frank, Ohio; $1.10 per net ton to Brink Haven and Baddow, Pass, Ohio.

8531. Agricultural lime. Marble Cliff, Ohio, to Ohio. Present, calssification basis; proposed, illustrations:

Destination	Rate, cents
Akron	8½
Bedford	8½
Bremen	7
Carrothers	8
Coalton	9½
Defiance	11½
Elyria	8½
Greenfield	8½
Ironton	11½
Leetonia	11½
Maple Grove	8
Mineral City	11
Newark	6½
Oneida	11
Ridgeway	7
Slater	8
Toledo	8½
Washington Court House	8½
Youngstown	11½

8532. Sand and gravel. Sandusky, Smith's Siding, Soldier's Home and Wilmer, Ohio, to Ohio.

To	Present Net ton	Proposed Net ton
Akron, Ohio	$1.20	$1.00
Barberton, Ohio	1.20	1.00
Clinton, Ohio	1.20	1.00
Easton, Ohio	1.00	.90
Rittman, Ohio	1.00	.90
Warwick, Ohio	1.00	.90

Tariff authority—B. & O. R. R. Tariff H3336A, Ohio No. WL 2728.

8536. Sand and gravel. Lafayette. Ind., to Lebanon, Ind. Present, 11½ cents; proposed, 83 cents per net ton.

8547. Stone, broken, crushed, in bulk, and screenings, in bulk. Rock Point, Penn., to Electra, Penn. Present, 21½ cents; proposed, $1.51 per net ton.

8552. Stone, crushed in bags, plaster or stucco in bags or in iron or steel drums; magnesium chloride in barrels or iron or steel drums, or in burlap bags with double lining or waterproofed paper (See note). In mixed carloads, minimum weight 50,000 lb., between C. F. A. territory, also from C. F. A. territory to destinations east of western termini of Eastern Trunk Lines and Canada. Note: The quantity of magnesium chloride not to exceed 20% of the gross weight of the carload. Proposed, 83.33% of sixth class.

8553. Crushed stone, in bags, wall plaster or stucco in iron or steel drums and plastic lumber (wood strips ¼ in. or over in thickness and asphalted paper combined) in mixed carloads, minimum weight 50,000 lb. Cincinnati, Ohio, and points taking same rates to C. F. A. and Canadian territories. Proposed, plastic lumber rates.

8556. Crushed stone and articles named in Note 80 of N. Y. C. Tariff I. C. C. L. S. No. 1158, Detroit, Mich., to Blissfield, Mich. Present, 14½ cents; proposed, $2.52 per net ton; proposed, $2.90 per net ton.

8557. Core sand. Vassar, Mich., to Erie, Penn. Present, $2.52 per net ton; proposed, $2.90 per net ton.

8559. Stone, crushed or broken. Amherst, Ohio, to Ohio. Present, sixth class; proposed (rates per ton of 2000 lb): To Ashland, Ohio, $1; Bucyrus, Ohio, $1.10; Creston, Ohio, 90 cents; Galion, Ohio, $1.10; Greenwich, Ohio, $1; Lodi, Ohio, 90 cents; Loudonville, Ohio, $1.20; Mansfield, Ohio, $1.10; Monroeville, Ohio, 90 cents; Orrville, Ohio, $1.10; Plymouth, 90 cents; Shelby, Ohio, $1; Shreve, Ohio, $1.20; Sterling, Ohio, 90 cents; Wadsworth, Ohio, $1.40; Williard, Ohio, 90 cents; Wooster, Ohio, $1.

8562. Sand ground from silica or pebble rock; loam, glass, molding or silica. Coalton, Buckeye, Branch, Mines and West Junction, Ohio, to Pittsburgh, Penn., and points taking same rates. Present, $2.52 per net ton; proposed, $2.02 per net ton.

Illinois Freight Association

2466A. Lime rock. Carloads, minimum weight 90% of marked capacity of car; except when loaded to full visible capacity, actual weight shall govern, from Mosher and St. Genevieve, Mo., to East Moline, Moline and Rock Island, Ill., and Davenport and Bettendorf, Iowa. Present, class rates; proposed, $2.75 per net ton.

2492. Sand and gravel. Carloads, minimum weight 90% of marked capacity of car; except when car is loaded to visible capacity, actual weight will apply, but not less than 40,000 lb. from Ottawa, Ill., to Aledo, Ill. Present, $1.25 per net ton; proposed, $1.13 per net ton.

2495. Stone, crushed. Carloads, minimum weight 90% of marked capacity of car; except when car is loaded to full visible capacity, actual weight shall govern.

	From Jaynes Spur and Gladstone, Ill.	
	Present	Proposed
Seaton, Ill.	Class E	$1.01 per net ton
Little York, Ill.	Class E	1.01 per net ton
Elenor, Ill.	Class E	1.01 per net ton
Nemo, Ill.	Class E	1.01 per net ton
Pheeps, Ill.	Class E	1.01 per net ton
Berwick, Ill.	Class E	1.01 per net ton
Abington, Ill.	Class E	1.01 per net ton
Hermon, Ill.	Class E	1.13 per net ton
London Mills, Ill.	Class E	1.13 per net ton
Rapatee, Ill.	Class E	1.13 per net ton
Middle Grove, Ill.	Class E	1.13 per net ton

2496. Stone, crushed. Carloads, minimum weight 90% of marked capacity of car; except when loaded to full visible or cubical capacity, actual weight will apply, from Lehigh, Ill., via N. Y. C. R. R., Hartsdale, Ind., and E. J. & E. R. R., to Brisbane, Frankfort, Matteson and Chicago Heights, Ill., and Dyer, Van Loom, Sand Pit, Ivanhoe and Cavanaugh, Ind. Present, 88 cents per net ton; proposed, 76 cents per net ton.

2499. Stone, crushed. Carloads, minimum weight 90% of marked capacity of car; except when loaded to full visible capacity, actual weight shall govern, from Chicago and Chicago district points to Galena, Ill. Present, Class basis; proposed, $1.51 per net ton.

2501. Stone, crushed. Carloads, minimum weight 90% of marked capacity of car, except when car is loaded to full cubical or visible capacity, actual weight will apply, but not less than 40,000 lb., from Thornton, Ill., to Tuscola, Ill. Present, 88 cents per net ton; proposed, 70 cents per net ton.

2503. Stone, crushed. Carloads, minimum weight 90% of marked capacity of car; except when car is loaded to full cubical or visible capacity, actual weight will apply, but not less than 40,000 lb., from Thornton, Ill., to Kansas, Ill. Present, $1.13 per net ton; proposed, $1.01 per net ton.

2506. Stone, crushed. Carloads, minimum weight capacity of car from Thornton, Ill., to Woosung, Ill., Present, Class rates; proposed, $1.01 per net ton.

2523. Sand and gravel. Carloads, minimum weight 90% of marked capacity of car; except when car is loaded to full visible capacity, actual weight will apply but not less than 40,000 lb., from Chillicothe, Ill., to Lewistown, Ill. Present, 10 cents per 100 lb.; proposed, $1.13 per net ton. (Class E.)

2115B. Sand and gravel. Carloads, minimum weight marked capacity of car; except when car is loaded to full visible capacity, actual weight will apply, but not less, from Muscatine, Iowa, to E. J. & E. Ry. stations, Rockdale Junction to Waukegan, Ill., inclusive. Present, Classification basis; proposed, $1.60 per net ton.

2430. Sand and gravel. Carloads, from Sheridan, Ottawa, Yorkville and Oregon, Ill., to Monmouth and Larchland, Ill.

From	To Monmouth, Ill. Proposed	Present
Sheridan, Ill.	.....	.....
Ottawa, Ill.	$1.13	$1.26
Yorkville, Ill.	1.13	1.26
Oregon, Ill.	1.13	1.26

From	To Larchland, Ill. Proposed	Present
Sheridan, Ill.	$1.13	$1.26
Ottawa, Ill.	1.13	1.26
Oregon, Ill.	1.13	1.26

2533. Sand, gravel and crushed stone. Carloads, minimum weight marked capacity of car; except when shipments are loaded in open top cars, and loaded to their full visible space capacity, actual weight will govern, from Joliet, Ill., to Woodson and Manchester, Ill. Present, $1.26 per net ton on sand and gravel; proposed, $1.20 per net ton on sand, gravel and crushed stone.

Southwestern Freight Bureau

936. Stone, crushed. To establish rate of 12 cents per 100 lb. on stone, broken, crushed and ground, carloads, minimum weight 50,000 lb. or marked capacity of car if less than 50,000 lb., from Dittlinger, Texas, to Elizabeth, La. The rate proposed is the same as applicable for the same distance between Texas points, and compares favorably with the rate that is in effect from New Braunfels to DeRidder, La.

950. Molding sand. To establish rate of 22½ cents per 100 lb. on molding sand, carloads, from Utica and Ottawa, Ill., to Muskogee, Okla. Interested shippers contend that since this rate has been established to Tulsa, Okla., there is no reason why it should not also be established to Muskogee.

1000. Cement, portland. To establish joint through rate of 25.5 cents per cwt. on cement, portland, carloads, minimum weight 50,000 lb., from Harrys and Eagle Ford, Texas, to stations in Louisiana on the N. L. & G. Ry., Walsh to Hodge, La., inclusive. Proposed change contemplates placing rate to these destinations on a proper relation to rates in effect from Ada, Okla.

1051. Cement, natural, or portland (building cement). To establish rate of 21½ cents per 100 lb. on cement, natural or portland (building cement) in bulk or in packages as provided for carload shipments in ages as provided for carload shipments in Consolidated Classification, carload, minimum weight, 50,000 lb., except when car of less capacity is furnished the minimum weight will be the capacity of car, but not less than 40,000 lb., from Ada, Okla., to Memphis, Tenn. Proposed change is desired in order to provide same rate from Ada to Memphis via all routes as now in effect via one route.

Transcontinental Freight Bureau

4818. Lime, acetate of. To Pacific Coast ports for export, carloads, W. B. Request that Item 150 of Export Trf. 29M (I. C. C. 26, A117, 1480 and 1128, N. W. Hawkes, H. Wilson, B. T. Jones and R. H. Countiss, agents, respectively) be amended to apply rates of 60 cents per 100 lb. from Marvindale, Penn.; Corryville, Penn.; Dahoga, Penn.; Morrison Station, Penn.; Sergeant, Penn.; Bradford, Penn.; Straight, Penn.; Crosby (McKean Co.), Penn.; Smethport, Penn.; Roulette (Potter Co.), Penn.; Port Allegany, Penn.; Lewis Run, Penn.; Ridgeway, Penn.; St. Mary's, Penn.; DeGolia, Penn.; Kaulmont, Penn.; Westline, Penn.; Bradford, Penn., and Custer City, Penn., same as provided from Lyles, Tenn., Charleston, Mass., and the Michigan points mentioned in explanation of characters in connection with Rate Bases, 1, 5 and 6 rates.

Trunk Line Association

12038. To cancel as point of origin Sandy Hook, Md., from B. & O. R. R., I. C. C. 19663, which publishes rates on lime carloads to Pennsylvania R. R. also to cancel Marriottsville and Sandy Hook, Md., from B. & O. R. R., I. C. C. 19287 which publishes rates on lime and ground limestone to points in Trunk Line territory other than on Pennsylvania R. R. account rates being obsolete. Classification basis to apply.

New England Freight Association

6431. Lime and limestone, minimum weight 60,000 lb., Canaan, Conn., and West Stockbridge, Mass., to Lee and West Stockbridge, Mass., 5 (to apply on shipments to be stored or reforwarded). Reason: Equalization of competitive conditions.

6432. Lime, minimum weight 50,000 lb., Canaan, Conn., to New York (130th street), N. Y.,

15½ cents. Reason: Equalization of competitive conditions.

6462. Lime, hydrated, Group 1. lime, agricultural, Group 2, Rockland district to Concord, N. H. (Fitchburg Division). Group 1, 15½ cents; Group 2, 12 cents. Reason: Same basis as currently in effect to Concord, N. H. (Southern Division).

Secure Reduced Rates on Agstone

FARMERS who buy limestone from the quarries in the East St. Louis district, and who are located in central and southern Illinois, will benefit from a recent conference between the crushed limestone producers of the East St. Louis district, the transportation department of the Illinois Agricultural Association and the Illinois commerce commission in Chicago. Promises were made by the railroads represented to republish their freight rates on crushed stone and agricultural limestone during the present month, with a decrease ranging from 7 to 40 cents per ton.

According to L. J. Quassey, head of the transportation department of the state association, and who was its representative at the conference, the saving will mean considerable to farmers who purchase limestone for their sour soil. From 340,000 to 350,000 tons of limestone is the estimated amount which will be used by Illinois farmers in 1924, according to figures published by J. R. Bent, head of the association's phosphate-limestone departments.

A saving of 17 cents per ton on agricultural limestone has also been effected by the association between the important limestone center of Greencastle, Ind., and Oblong, Gordons and Palestine, Ill., which took effect May 20. The new rates apply via the Big Four and the Illinois Central railroads. The former rate was $1.38 per ton, but is now $1.21.—*Davenport (Iowa) Times.*

Seeks to Establish Gravel and Sand Rate

PETITIONS have been filed by the Western railway of Alabama with the Alabama Public Service Commission seeking to establish a rate of 79 cents per ton, carlot, on sand and gravel from Montgomery, and 65 cents from Arrowhead, Mt. Meigs, Rice, Chehaw and Cooks to Ashberry, and to establish a rate of 75 cents per ton from Cooks, Arrowhead, Mt. Meigs, Rice and Chehaw and Tallahassee. The petitions were set for June 2.

Virginia Sand and Gravel Companies Win Reduced Rates

THE Arundel, Old Dominion and Dunlop sand and gravel companies have won their fight for reduced rates on sand and gravel from their plants in Deerfield county, Virginia, to Petersburg, Va. The reduction was from 51 to 36 cents per ton.

Reduction in Kansas Cement Rates

THE state public utilities commission of Kansas have issued an order authorizing a decrease in the rates on cement in carlots shipped over the Missouri, Kansas & Texas from Mildred, Kans., to other points in the state. The reduction amounted in most cases to ½ cent per 100 lb., in some cases to a full cent a hundred. The Katy is authorized to publish the new tariffs on one day's notice.

The new rates as authorized by the order are as follows from Mildred to: Hepler, Hiatville, Hollister, Ronald, Idenbro and Wilsonton, 9½ cents; Montana, Sherman City, Star Valley, Oswego, Condon, 10 cents; Coffeyville, O'Herin and Columbus, 10½ cents.

Commissioner Ed T. Hackney stated after the issuance of the order that it was not intended to disrupt the rate fabric of the state in cement, but was to have only a local application.—*Topeka (Kans.) Capital.*

Attack Gravel Rate

COMPLAINT for the Roquemore Gravel Co. against rates on sand charged by the Western to Atlanta, Ga., has been filed by the transportation bureau of the Chamber of Commerce with the Interstate Commerce Commission. The complaint claims that the rates are discriminatory when compared with those charged other gravel pits east of Montgomery.—*Montgomery (Ala.) Advertiser.*

Suspend Advance in Texas Cement Rates

THE Texas railroad commission has suspended cement rates scheduled to become effective May 15 until further notice as a result of being advised that the interstate committee has suspended until September 12 the advanced rates on cement from Oklahoma to Texas.—*Dallas News.*

Protests Sand and Gravel Rate

ACCORDING to local papers, X. B. Wickersham has protested against the rate of 80 cents per ton on sand and gravel from Paducah to Mayfield, Ky., charged by the Illinois Central railroad. He asks the Kentucky state railroad commission to have the rate made 40 cents per ton.

Rail Reductions on Shipments of Cement Granted

AUTHORIZATION was given by the State Railroad Commission yesterday for a 40-cent reduction per ton on carload shipments of cement moving from mills in Southern California to Los Angeles, San Pedro, Wilmington and other points in the vicinity of the city.

The order was made on the application of the Santa Fe, Los Angeles and Salt Lake, Pacific Electric and Southern Pacific railways. It was said large movements of cement through the local harbor are temporarily being transported to construction jobs by auto truck. A loss in rail tonnage has resulted, they contend, as under normal conditions they would carry the cement to the consuming points.

The rates will become effective, according to the commission order, five days after the filing of tariffs and will effect shipments from cement mills located at Ore Grande, Victorville, Colton, Crestmore, Riverside Junction and Monolith. The rates will expire December 31, 1924.

Readers! Do Your Part If These Men Come Your Way

EIGHT of the forty delegates from Latin American countries, who are to make a field study of highways of the United States this summer, as guests of the Highway Education Board, have formally conveyed, through the Department of State, acceptances of the invitations extended them, it is announced. Other acceptances are expected daily.

These delegates are from Argentina, Chile, Uruguay and Salvador, four of the twenty nations to be represented on the tour.

Nations from which delegates are yet to be reported include Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela.

The delegates from these countries will be known as the Pan American Highway Commission. According to present plans the representatives will arrive in the United States about the first of June. They will proceed to Washington, where the commission will be organized by officials of the board, and after a brief period of entertainment, proceed at once to make an intensive field study of highway conditions in the United States.

The itinerary of the commission has not yet been definitely settled upon. It will be announced presently. States to be visited will be chosen where the climatic, soil, topographic and financial characteristics as closely approximate Latin American conditions as possible, and where, too, the commission will have an opportunity to study the most approved highway engineering systems in the United States.

The tour will extend over the greater part of June, and the commission will cover several thousand miles by automobile and rail. In this project the board has the cooperation of the leaders in highway education, highway transport and highway engineering in this country, and the national organizations concerned in highway improvement both here and in the countries to the south.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Blakeslee, N. Y.	1.00	1.40	1.40	1.30	1.30	.....
Buffalo, N. Y.			1.30 per net ton all sizes			
Cobleskill, N. Y.	1.25	1.25	1.25	1.25	1.25	.....
Coldwater, N. Y.			1.50 per net ton all sizes			
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.30	1.40	.....
Prospect, N. Y.	1.00	1.40	1.40	1.25	1.25	.....
Walford, Pa.	.....	.....	1.30	1.45	1.55	1.55
Watertown, N. Y.	.50	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.75	.....	1.75	1.50	.....	.....
Buffalo, Iowa	.90	.....	1.30	1.10	1.15	1.15
Cypress, Ill.	1.20	1.35	1.35	1.20	1.20	1.10
Dundas, Ont.	.90	1.10	1.10	1.05	1.00	1.00
Gary, Ill.	1.10	1.40	1.10	1.10	1.10	1.10
Greencastle, Ind.	1.25	1.25	1.15	1.05	1.05	1.05
Lannon, Wis.	.80	1.00	1.00	.95	.95	.95
Northern Wisconsin	.50@1.75	.....	1.00	.90	.90	.....
St. Vincent de Paul, P. Q.	.75	1.25@1.45	1.10	1.00	1.00	1.00
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	.....
Stone City, Iowa	.75	.....	1.40	1.30	1.25	.....
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Canada	1.90‡	2.25‡	2.25‡	2.25‡	2.00‡	2.00‡
Waukesha, Wis.	1.15	1.15	1.15	1.15	1.15	1.15
Youngstown, Ohio	.....	.....	1.30	1.55	1.55	1.55
SOUTHERN:						
Alderson, W. Va.	.75	1.75	1.75	1.60	1.50	.....
Bridgeport and Chico, Texas	1.00@1.25	1.50@1.60	1.30@1.40	1.25@1.35	1.25@1.35	1.25@1.30
Cartersville, Ga.	1.75	1.50	1.50	1.15	1.00	.....
El Paso, Texas	1.00	1.00	1.00	1.00	.....	.....
Graystone, Ala.		Crusher run with fines out, 1.00 per net ton				
Graysville, Ga.	1.00	.90@1.00	.....	.90@1.00	.80@1.00	.....
Rock Crusher, Ky.	1.50	1.25	1.25	1.25	1.25	1.15
Russellville, Ala.	1.25	1.25§	1.50a	1.15§	1.00a	1.00
WESTERN:						
Atchison, Kans.	.50	.....	2.00	2.00	2.00	1.60‖
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.35	.....	1.25	1.25	1.00	.....
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.60	1.35	1.15	1.00	.....
Duluth, Minn.	.90@1.00	2.25	1.90@2.00	1.40@1.50	1.35@1.40	1.35@1.40
Dresser Junction, Wis.	1.00	1.00	2.25	2.00	1.75	.....
El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	.....
E. Summit, N. J.	1.50	2.00	1.80	1.40	1.40	.....
Eastern Maryland	1.10	1.75	1.70	1.60	1.50	1.50
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.75	1.70	1.60	1.50	1.50
Meriden, Middlefield, New Britain, Rocky Hill, Conn.	.60	1.60	1.35	1.15	1.00@1.10	1.00
Northern New Jersey	1.50	2.00	1.80	1.40	1.40	.....
Oakland, Calif.	1.75	1.75	1.75	1.75	1.75	.....
Richmond, Calif.	.50	.....	1.50*	1.50*	1.50*	.....
San Diego, Calif.	.50@ .75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	1.80	2.00	2.00	1.70	1.50	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	.....
Columbia, S. C.	.50	.....	2.00	.....	1.60	.....
Eastern Penna.—Sandstone	1.25	1.65	1.60	1.40	1.40	1.25
Eastern Penna.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Lithonia, Ga.—Granite	.75	2.00	1.75	1.25	1.25	1.25
Lohrville, Wis.	1.65	1.65@1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.—Granite	.....	.....	2.00@2.25	2.00@2.25	.....	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	.....

*Cubic yd. †1 in. and less. ‡Prices include 90c freight. ‖Rip rap per ton. §Dust in. (a) Dust out.

Agricultural Limestone

(Pulverized)

Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers 5.00

Hillsville, Pa.—Analysis, 94% $CaCo_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; 94% thru 50 mesh; sacks, 5.00; bulk 3.50

Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk 2.50

Watertown, N. Y.—Analysis 96-99% $CaCo_3$; 0.02% $MgCo_3$—90% thru 100 mesh, bags, 4.50; bulk 3.00

Rockdale, Mass.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

North Pownal, Vt.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

West Stockbridge, Mass.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh, 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk 3.00

Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 100% thru 4 mesh; 80 lb. paper sacks, 5.00; bulk 3.50

Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100 ..... 2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk 3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk 5.50

Mayville, Wis. 2.35

Cartersville, Ga.—Pulverized limestone 2.50

Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk 2.70

Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200 lb. burlap bag, 4.00; bulk 2.75

Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk 4.00

Agricultural Limestone

(Crushed)

Bedford, Ind.—Analysis, 98½% $CACO_3$, ½% $MgCO_3$; 90% thru 10 mesh, 30% thru 100 mesh ..... 1.50@ 2.00

Independence, Mo.—Analysis, 94% $CaCO_3$ 1.25

Bettendorf, Iowa—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50

Blackwater, Mo.—96% $CaCO_3$; 100% thru 8 mesh 1.00

Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh 1.50

Carthage, Mo.—Analysis, 98½% $CaCO_3$; 100% thru 10 mesh, 30% thru 100 mesh 1.75

Alton, Ill.—Analysis 99% $CACO_3$; 100% thru 4 mesh 1.75

Gary, Ill.—Analysis, 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 100 mesh 1.10

Cypress, Ill.—Analysis, 96.12% $CaCO_3$, 2.5% $MgCO_3$; 50% thru 50 mesh 1.25

Kansas City, Mo.—50% thru 100 mesh 1.25

Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$—50% thru 100 mesh; 50% thru 4 mesh 1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 100% thru 4 mesh; 85% thru 10 mesh; 53% thru 50 mesh; 40% thru 100 mesh (meal) bulk	1.60
32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% 4 mesh (screenings) bulk	1.25
Milltown, Ind. — Analysis, 91.95% $CaCO_3$, 4.87% $MgCO_3$; 36% thru 100 mesh, 43.2% thru 50 mesh	1.45@ 1.60
Monroe, Mich.—Analysis, 51.91% $CaCO_3$, 44.17% $MgCO_3$; agricultural limestone meal, 3/16 in. to dust, 30% thru 100 mesh	1.60
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Bridgeport, Texas: Screenings from ⅛ in. down to flour	1.50
Chico, Texas: Screenings from ⅛ in. down to flour	1.50
Alderson, W. Va. — Analysis, 90% $CaCO_3$; 50% thru 100 mesh	1.50
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh	1.50

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated.

Glass Sand:	
Berkeley Springs, W. Va.	2.25@ 2.50
Cedarville, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass: 6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.50@ 1.75
Grays Summit and Klondike, Mo.	2.00
Hancock, Md.—Damp	1.50
Dry	2.00
Mapleton, Pa.	2.25@ 2.50
Mapleton Depot, Pa.	2.25@ 2.50
Massillon, Ohio	3.00
Michigan City, Ind.	.50
Millville, N. J.	2.00
Mineral Ridge, Ohio	2.50
Ottawa, Ill.	1.25@ 1.50
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Pa.—Dry	4.00
Damp	3.00
Ridgway, Pa.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	3.00@ 3.50
St. Louis, Mo.	1.50@ 3.00
South Vineland, N. J.—Damp	1.75
Dry	2.25
Thayers, Pa.	2.50
Utica, Ill.	1.25 1.40
Zanesville, Ohio	2.50
Foundry Sand:	
Albany, N. Y.: Core	1.50
Molding fine, brass molding	2.25
Molding coarse	2.00
Sand blast	4.00
Arenzville, Ill.—Molding fine	1.50@ 1.70
Brass molding	1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse	5.00
Sand blast	5.00@ 8.00
Stone sawing	6.00
Columbus, Ohio: Core	.25@ .35
Furnace lining	2.00@ 2.50
Molding fine	1.50@ 2.00
Molding coarse	1.50@ 1.75
Sand blast	3.50@ 5.00
Stone sawing	1.50
Traction	.25@ 1.00
Brass molding	2.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge and So. Hts., Pa.	1.25	1.25	1.15	.85	.85	.85
Attica, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95	.....	.....	.85	.....
Farmingdale, N. J.	.48	.48	.75	.....	1.10	.....
Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Machias, N. Y.	.75	.75	.75	.75	.75	.75
Pittsburgh, Pa., and vicinity	.....	1.15@1.25	.....	.65@ .85	.65@ .85	.65@ .85
Washington, D. C.—Rewashed, river	.75	.75	1.60	1.40	1.20	1.20
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.	.....	.60	.....	.70	.70	.....
Beloit, Wis.	.....	.70	.....	.....	.80	.....
Columbus, Ohio	.85	.85	.75	.75	.75	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	50	1.25	1.60	1.60	1.60
			Unwashed ballast, .50 ton			
Eau Claire, Wis.	.40	.40	1.00@1.25	.....	.....	.85
Elkhart Lake, Wis.	.55	.40	.50	.50	.50	.50
Ft. Dodge, Iowa	1.00	1.00	2.10	2.10	2.10	2.10
Grand Rapids, Mich.	.....	.50	.....	.80	.70	.70
Hamilton, Ohio	.....	1.00	.....	.....	1.00	.....
Hersey, Mich.	.50	.....	.....	.....	.....	.75
Indianapolis, Ind.	.60	.60	.....	.90	.75@1.00	.75@1.00
Janesville, Wis.	.....	.65@ .75	.....	.....	.65@ .75	.....
Mason City, Iowa	.45@ .55	.45@ .55	1.55	1.55	1.45	1.45
Mankato, Minn.	.....	.50	1.35	1.35	1.35	1.35
Milwaukee, Wis.	1.01	1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.	.35	.35	1.35	1.35	1.35	1.25
Moline, Ill.	.60	.60	1.20	1.20	1.20	1.20
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f.o.b cars	1.20	1.45	1.65§	1.45	.....	1.45‖
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	.85
Waukesha, Wis.	.50	.50	.80	.80	.80	.80
Winona, Minn.	.40	.40	1.25	1.10	1.00	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.			.37 to .65 pit			
Zanesville, Ohio	.70	.....	.60	.....	.90	.....
SOUTHERN:						
Brookhaven, Miss., Roseland La.	.....	1.35	.....	.....	1.25	.....
Charleston, W. Va.	all sand 1.37 f.o.b cars		all gravel 1.47 f.o.b. cars			
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.50	.50	.....	.75	.75	.75
New Martinsville, W. Va.	1.00	1.00	.....	1.20	.....	.80
WESTERN:						
Baldwin Park, Calif.	.....	.25@ .40	.50@ .70	.....	.50@ .70	.....
Kansas City, Mo.			Kaw river sand .75 per ton f.o.b. plants			
Los Angeles, Calif.	.70	.70	1.10@1.15	.....	1.10@1.15	.....
Pueblo, Colo.	1.10*	.90*	.....	1.75*	.....	1.60*
San Diego, Calif.	50@ .65	.80@ .90	1.40@1.50	1.20@1.30	1.00@1.10	1.00@1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*
Webb City, Mo. (flint)	.75	.75	.25@ .75b	.85b	1.25c	1.15c

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80	.....	.55@ .75	.....	.....	1.00
Brookhaven, Miss., Rosel'd, La.	.75	.50	.....	.....	1.25	.....
Dudley, Ky.‡	1.05	1.05	.....	1.00	.....	.....
East Hartford, Conn.			Sand, .65 per cu. yd.			
Elkhart Lake, Wis.	.60	.50	.....	.....	.....	.....
Fishers, N. Y. (filter sand)	.75	.60@ .75	.....	.60	.....	.....
Gainesville, Texas	.....	.95	.....	.....	.....	.55
Grand Rapids, Mich.	.....	.....	.....	.80	.....	.....
Hamilton, Ohio	.....	.....	.....	.....	.70	.....
Hersey, Mich.	.....	.....	.....	.55	.....	.....
Indianapolis, Ind.			Mixed gravel for concrete work, .65			
Lindsay, Texas	.....	.95	.....	.....	.....	.55
Mankato, Minn.			Pit run gravel, .60			
Moline, Ill.	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.	.....	.....	.....	.....	.....	.60
St. Louis, Mo.	.....	.....	.....	.....	.....	1.55
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Pa.	1.10	1.10	(crushed rock)			
Zanesville, Ohio	.....	.60	.....	.....	.....	.....

*Cubic yd.; †pebbles; §⅝ in. and less; ‡crushed rock; ‖2½ in. and less; (a) ¾ in. and less; (b) flint chats; (c) crushed flint.

Miscellaneous Sands

(Continued from preceding page)

Delaware, N. J.:		
Molding fine		2.00
Molding coarse		1.90
Brass molding		2.15
Dunbar, Pa.:		
Traction (Mill)		2.25
Eau Claire, Wis.:		
Roofing sand		3.25
Sand blast		3.25
Franklin, Pa.:		
Core		2.00
Furnace lining		2.50
Molding coarse		2.00
Brass molding		2.75
Grays Summit and Klondike, Mo.:		
Molding fine	1.75@	2.00
Joliet, Ill.:		
No. 2 molding sand and loam for luting purposes; milled		.85
Bank run		.65
Kasota, Minn.:		
Stone sawing (green)		1.50
Mapleton Depot, Pa.:		
Molding coarse		2.25
Molding fine		2.50
Traction	2.00@	2.25
Roofing sand		2.25
Massillon, Ohio:		
Molding fine, coarse, furnace lining and core		3.00
Traction		2.50
Michigan City, Ind.:		
Core	.50@	.55
Traction		.40
Millville, N. J.:		
Core		2.00
Mineral Ridge and Ohlton, Ohio:		
Core (damp)		1.90
Furnace lining, roofing sand, stone sawing, traction (green)		1.75
Molding fine and coarse (green)		2.00
Montoursville, Pa.:		
Core	1.25@	1.40
Traction		1.10
Brass molding		1.50
New Lexington, Ohio:		
Molding fine		2.00
Molding coarse		1.50
Ottawa, Ill.:		
Crude silica sand	.85@	1.00
Core, furnace lining, steel molding		1.50
Roofing sand	1.50@	4.50
Sand blast		4.50
Ottawa, Minn.:		
Crude silica sand	.75@	1.00
Pacific, Mo.:		
Core, furnace lining	1.00@	1.25
Molding fine	.90@	1.00
Stone sawing	1.00@	1.75
Molding coarse	.85@	1.00
Ridgway, Pa.:		
Core		2.00
Furnace lining, molding fine, molding coarse		1.25
Traction		2.25
Rockwood, Mich.:		
Roofing sand		3.00
Sand blast		3.75
Round Top, Md.:		
Sand blast		2.25
Traction		1.75

Crushed Slag

City or shipping point		¼ in.	½ in.	¾ in.	1½ in.	2½ in.	3 in.
EASTERN:	Roofing	down	and less	and less	and less	and less	and larger
Buffalo, N. Y.	2.25	1.25	1.35	1.25	1.25	1.25	1.25
E. Canaan, Conn.	4.00	1.00	2.00	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	.....	1.45	.....	1.45	1.45	1.45	.....
Jackson, Ohio	.....	1.30	.....	1.30	1.30	1.30	.....
Toledo, O.	1.50	1.35	1.50	1.35	1.35	1.35	1.35
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	.....	1.55	.....	1.55	1.55	1.55	.....
Ensley, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Bellefonte, Pa.	.....	10.50*	10.50*	10.50*	9.00	.....	8.50	1.80
Buffalo, N. Y.	.....	.....	.....	12.00	.....	.....	.....	.....
Berkeley, R. I.	.....	.....	12.00	.....	.....	.....	.....	2.30
Lime Ridge, Pa.	.....	.....	.....	.....	.....	.....	5.00a	.....
Williamsport, Pa.	.....	.....	10.00	.....	.....	.....	6.00	.....
York, Pa. (dealers' prices)	.....	10.50	10.50	10.50	.....	.....	8.50	1.65b
CENTRAL:								
Cold Springs, Ohio	.....	11.00	10.00	.....	9.00	11.00‖	10.00	.....
Delaware, Ohio	12.50	10.00	9.00	11.00	.....	.....	9.00	1.60
Gibsonburg, Ohio	12.50	.....	10.50	.....	9.00	11.00	10.00	.....
Huntington, Ind.	.....	11.00	10.00	.....	9.00	11.00	10.00	1.60c
Luckey, Ohio	12.50‡	.....	.....	.....	.....	.....	.....	.....
Marblehead, Ohio	.....	11.00	10.00	.....	.....	.....	10.00	1.60d
Marion, Ohio	.....	11.00	10.00	.....	.....	.....	10.00	1.80†
Mitchell, Ind.	.....	12.00	12.00	12.00	11.00	.....	10.00	1.70k
Sheboygan, Wis.	.....	.....	.....	.....	.....	.....	9.50	.....
Tiffin, Ohio	.....	.....	.....	.....	9.00	.....	.....	.....
White Rock, Ohio	12.50	.....	.....	.....	9.00	11.00	.....	.....
Woodville, Ohio	12.50‡	11.00‡	9.50‡	13.50	9.00	10.00	9.00	1.60
SOUTHERN:								
Erin, Ten.	.....	.....	.....	.....	.....	.....	8.50	1.50
El Paso, Texas	.....	.....	.....	.....	.....	.....	9.00	1.50
Graystone and Wilmay, Ala.	12.50	11.00	.....	11.00@12.50	.....	.....	8.50	1.50
Karo, Va.	.....	.....	.....	.....	.....	.....	7.00	1.50
Puntenny, Ariz.	.....	.....	.....	.....	10.00h	.90i	9.50h	1.70j
Staunton, Va.	.....	.....	.....	.....	.....	.....	1.50	.....
Varnons, Ala. (l)	11.00	11.00	11.00	11.00	9.50	.67½g	8.50	1.50
Zuber and Ocala, Fla.	13.00	13.00	10.00	.....	.....	1.50	12.00	1.60
WESTERN:								
Colton, Calif.	.....	.....	15.00	.....	.....	.....	19.70	.....
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
San Francisco, Calif.	22.00	22.00	15.00	22.00	.....	.....	.....	2.50
Tehachapi, Calif.	.....	.....	.....	.....	.....	.....	15.00	2.25

*Paper sacks; †180-lb. net, non-returnable metal barrel; ‡50-lb. paper bags, terms 30 days net, 25c per ton or 5c per bbl. discount for cash in 10 days from date of invoice; (a) f.o.b. kilns; (b) 180 lb. net, 2.65, 280 lb. net; (c) wooden bbl; (d) wooden, 1.60, steel, 180; (e) wooden bbl., steel bbl., 2.20; (g) per bag of 90 lb.; (h) to 12.50; (i) to 1.00 90-lb. sack, 25c credit if returned; (j) to 2.10; (k) wooden bbl., steel 2.20; (l) dealers' prices.

Miscellaneous Sands

(Continued)

St. Louis, Mo.:		
Core	1.00@	1.75
Furnace lining		1.50
Molding fine	1.50@	2.50
Molding coarse	1.25@	1.75
Roofing sand		1.75
Sand blast	3.50@	4.50
Stone sawing	1.25@	2.25
Traction		1.25
Brass molding	2.00@	3.00
San Francisco, Calif.:		
(Washed and dried)—Core, molding fine, roofing sand and brass molding (Direct from pit)	3.00@	3.50
Furnace lining, molding coarse, sand blast		3.60
Stone sawing, traction		2.30
Tamalco, Ill.:		
Molding coarse	1.40@	1.60
Brass molding		1.75
Tamms, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Thayers, Pa.:		
Core		2.00
Furnace lining		1.25
Molding fine and coarse		1.50
Traction		2.00
Utica, Ill.:		
Core (crude and dry)	.75@	1.25
Furnace lining (crude and dry)	.65@	1.25
Molding fine (crude and dry)	.65@	1.25
Molding coarse (crude and dry)	.65@	1.25
Roofing sand (fine and coarse)	1.25@	2.25
Sand blast		2.25
Stone sawing	1.25@	2.25
Traction		1.25
Brass molding		1.25
Warwick, Ohio:	.....	.....
Core, furnace lining, molding fine and coarse (all green), 1.75; all dry		2.50
Traction		2.50
Zanesville, Ohio:		
Sand blast		2.50
Core		2.00
Molding fine		2.00
Molding coarse		1.50
Furnace lining		2.00
Traction		2.00

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:		
Crude talc (mine run)	3.00@	4.00
Ground talc (20-50 mesh), bags		10.00
Cubes		55.00
Blanks (per lb.)		.08
Pencils and steel workers' crayons, per gross		1.25
Chatsworth, Ga.:		
Ground (150-200 mesh)		15.00
Pencil and steel workers' crayons, per gross	1.50@	2.50
Chester, Vt.:		
Ground (150-200 mesh)	8.50@	10.00
Including bags	9.50@	11.00
E. Granville, Rochester, Johnson, Waterbury, Vt.:		
Ground talc (20-50 mesh) bags	7.00@	10.00
Ground talc (150-200 mesh) bags	10.00@	25.00
Pencils and steel workers' crayons, per gross	.75@	2.00
Emeryville, N. Y.:		
(All air floated)—325 mesh, bags		14.75
150-200 mesh, bags		13.75
Henry, Va.:		
Crude talc (mine run) per 2000-lb. ton	2.75@	3.50
Ground (150-200 mesh), bags	9.75@	14.00
Keeler, Calif.:		
(150-200 mesh); carloads, 60,000 lbs. (bags extra)	20.00@	30.00
Marshall, N. C.:		
Crude (gray)	4.50@	5.00
Ground (60-80 mesh) (bags extra)	6.50@	7.50
Ground talc (150-200 mesh); bags	8.00@	12.00
Natural Bridge, N. Y.:		
Ground talc (300-325 mesh), 200-lb. bags	13.00@	15.00
Waterbury, Vt.:		
Ground talc (20-50 mesh), bulk (Bags extra)	7.50@	10.00
Ground talc (150-200 mesh), bulk (Bags extra)	10.00@	22.50
Pencils and steel workers' crayons, per gross	1.20@	2.50

Rock Phosphate

(Raw Rock)

Per 2240-lb. Ton

Centerville, Tenn.—B.P.L. 65%, bags		8.50
Bulk		6.50
Gordonsburg, Tenn.—B.P.L. 65-68%	4.50@	5.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.50

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12	$10.20	$10.00	$8.10	$7.80
24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10	12.60	11.00	8.70	8.75
18x10	12.60	11.00	8.70	8.75
18x 9	12.60	11.00	8.70	8.75
16x10	12.60	11.00	8.40	8.75
16x 9	12.60	11.00	8.40	8.75
16x 8	12.60	11.00	8.40	8.75
18x12	12.60	11.00	8.70	8.75
16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x 8	11.10	10.50	8.10	7.80
14x 7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

(Ground Rock)

Mt. Pleasant, Tenn.—B.P.L. 72%	5.50
Twomey, Tenn.—B.P.L. 65%	6.50@ 7.50

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L.	2.25
70% min. B.P.L.	2.50
72% min. B.P.L.	2.75
75/74%	3.75
Jacksonville (Fla.) District	10.00@12.00

(Ground Land Pebble)

Per Ton

Jacksonville (Fla.) District	14.00
Add 2.50 for sacks.	
Morristown, Fla.—26% phos. acid	16.00

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	20.00@22.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	22.00@23.50

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Easton, Pa.—Slate granules		7.00
Haddam, Conn. — Felstone buff	12.00	12.00
Harrisonburg, Va.—Blk. marble (crushed, in bags	12.50@18.00	12.50@18.00
Ingomar, Ohio (in bags)		6.00@25.00
Mertztown, Pa. (granite) bags, $10.00; bulk		8.00
Middlebrook, Mo.—Red		25.00@30.00
Milwaukee, Wis. (del.)		16.00@30.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Phillipsburg, N. J.—Evergreen, bulk	8.00@10.00	8.00@10.00
Creme and royal, bulk	15.00@20.00	15.00@20.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Tuckahoe, N. Y.—2000 lb.		8.00@12.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

Concrete Brick

Prices given per 100 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Carpenterville, N. J.	23.00	31.50@41.50
Ensley, Ala. ("Slagtex")	11.50	22.50@33.50
Friesland, Wis.	22.00	32.00
Omaha, Neb.	18.00	30.00@40.00
Portland, Ore.	21.00	30.00@60.00
Puyallup, Wash.	20.00	30.00@90.00
Rapid City, S. D.	18.00	25.00@40.00
Salem, Ore.	23.00	35.00@75.00
Watertown, N. Y.	18.00@21.00	32.00@35.00
Wauwatosa, Wis.	15.00@16.00	28.00@75.00
Winnipeg, Can.	15.50	

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass.	15.00@16.50
Dayton, Ohio	12.50@13.50
Grand Rapids, Mich.	11.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis. (delivered)	13.00
Plant City, Fla.	10.00@15.00
Portage, Wis.	15.00
Rives Junction and Saginaw, Mich.	12.00
Saginaw, Mich.	12.00
San Antonio, Tex.	12.50@13.50
Syracuse, N. Y. (delivered at job)	20.00
F.o.b. cars	17.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, Finishing	per ton Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	20.00
Dallas, Tex.	20.00	———
Denver, Colo.	24.00	———
Detroit, Mich.	22.00	20.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.	———	21.00
New York, N. Y.	18.20	13.10
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.60	———
Seattle, Wash. (paper sacks)	24.00	———

Portland Cement

Prices per bbl. and per bag net in carload lots.

	Per Bag	Per Bbl.
Atlanta, Ga.	———	2.60
Boston, Mass.	———	2.53@3.03†
Buffalo, N. Y.	———	2.38@2.88†
Cedar Rapids, Iowa	.60	2.40
Cincinnati, Ohio	.61¼	2.47
Cleveland, Ohio	.59¼	2.39
Chicago, Ill.	.55	2.20
Columbus, Ohio	———	2.44
Dallas, Texas	.53¼	2.15
Davenport, Iowa	.59¼	2.39
Dayton, Ohio	———	2.45
Denver, Colo.	.63¼	2.55
Detroit, Mich.	.60	1.995@2.40
Duluth, Minn.	.54¼	2.25
Indianapolis, Ind.	.60¼	2.41
Kansas City, Mo.	.64¼	2.37
Los Angeles, Cal. (less 5c dis.)	.60	3.08
Memphis, Tenn.	———	2.60
Milwaukee, Wis.	.58¼	2.35
Minneapolis, Minn.	.60½	2.42
Montreal, Canada (sks. 20c ext.)	———	2.25
New Orleans, La.	———	2.90
New York, N. Y.	———	2.15@2.65†
Philadelphia, Pa.	———	2.41@2.81†
Phoenix, Ariz.	.82½	3.30
Pittsburgh, Pa.	.54¼	2.19
Portland, Ore.	———	3.05
San Francisco, Cal.	———	2.61*
St. Louis, Mo.	.57½	2.30
St. Paul, Minn.	.60½	2.42
Seattle, Wash. (10c bbl. dis.)	———	2.90
Toledo, Ohio	.61¼	2.005@2.45

NOTE—Add 40c per bbl. for bags.
*5c cash disc. 10 days.
†Prices to contractors, including bags.

Mill prices f. o. b. in Carload Lots to Contractors

	Per Bag	Per Bbl.
Buffington, Ind.	.48¾	1.95
Concrete, Wash.	———	2.60
Dallas, Texas	———	2.10
El Paso, Tex.	.70	2.08*
Hannibal, Mo.	———	1.95
Hudson, N. Y.	———	2.05
Leeds, Ala.	———	1.95
Los Angeles, Calif.	———	2.65
Louisville, Ky.	———	2.35
Northampton, Pa.	———	1.95
Phoenix, Ariz.	———	4.30†
Steelton, Minn.	.50	2.00
Universal, Pa.	.48¾	1.95

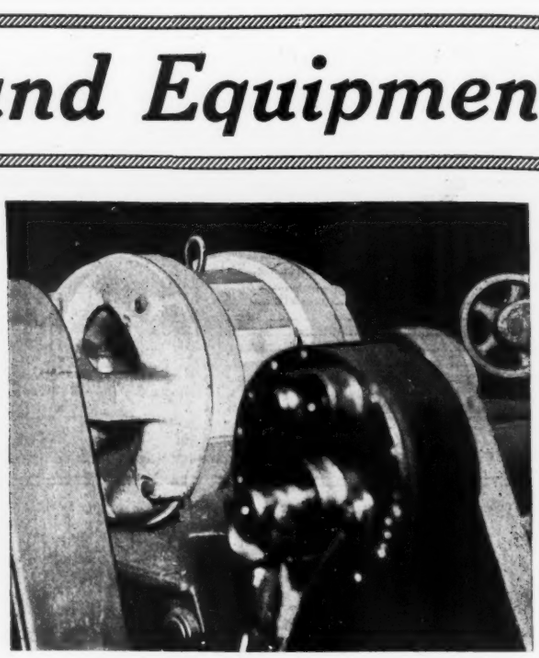
*Gross, 10c sacks and 10c per bbl. disc 10 days.
†Gross, 15c sacks and 5c per bbl. disc. 10 days.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	¼x32x36" Plaster Board Weight 1500 lb. Per M Sq. Ft.	⅜x32x36" Plaster Board Weight 1850 lb. Per M Sq. Ft.	⅜x32 or 48" Wallboard, Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Agatite, Texas (a)	.....	.....	6.00	10.00	10.00	10.50	10.00	.....	19.00	.....	.....	.....	.....
Akron, N. Y. (a)	3.00	4.00	6.00	10.00	10.00	10.00	20.20	7.00@9.00	27.35	21.00	19.375	20.00	30.00@32.00
Black Hawk, S. D.	3.50	.....	7.00	8.00	10.00	10.50	.....	.....	.....	.....	.....	.....	.....
Blue Rapids, Kans. (a)	2.50	4.00	6.00	10.00	10.00	10.50	10.00	.....	23.15	19.00	19.375	20.00	.....
Denver, Colo.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas, Ariz.	.....	.....	6.00	.....	15.00	.....	.....	.....	.....	15.50	.....	.....	.....
Ft. Dodge, Iowa (a)	2.50	4.00	6.00	10.00	10.00	10.50	15.45	.....	22.70	20.00	19.375	20.00	30.00
Grand Rapids, Mich.	2.75	.....	6.00	10.00	10.00	10.00	.....	.....	.....	.....	20.00	21.00	30.00
Gypsum, Ohio (a)	2.75	4.00	6.00	10.00	10.00	10.00	19.25	7.50	26.85	19.00	19.375	20.00	30.00
Port Clinton, Ohio	3.00	4.00	6.00	8.00	10.00	10.00	.....	7.50	30.15	.....	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	12.00	12.00	15.40†	.....	.....	16.40‡	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	.....	.....	.....	.....	28.50	.....	36.00

NOTE—Returnable Bags, 10c each; Paper Bags $1.50 per ton extra (not returnable).
†CL.; LCL., $16.50; ‡finishing, CL.; LCL., $17.50; (a) prices are net of bags.

New Machinery and Equipment



Left: Motor with the new bearing driving a centrifugal pump in a steel mill. Right: This squirrel cage motor has been operating continuously in severe machine tool service for nearly a year with no oil being added to the bearings

New Leakproof Sleeve Bearing for Electric Motors

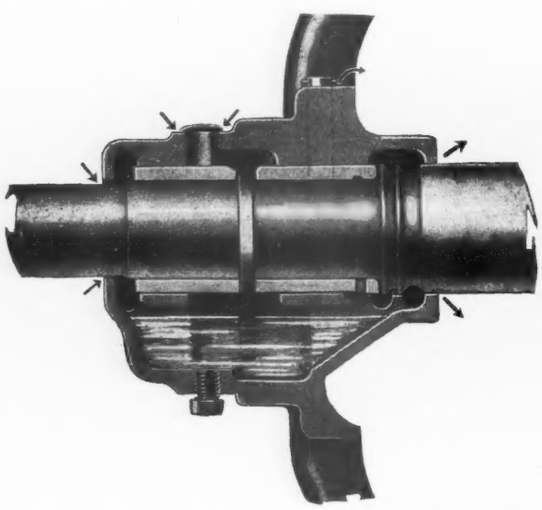
A NEW type of sleeve bearing for electric motors will interest operators of crushing plants and the like because it is designed to prevent the leakage of oil into the windings or the entrance of dust and grit into the bearing. It has been developed by the Westinghouse Electric and Manufacturing Co. and is known as the sealed-sleeve bearing, being constructed so that it is almost air tight, preventing air from getting in and oil from leaking out.

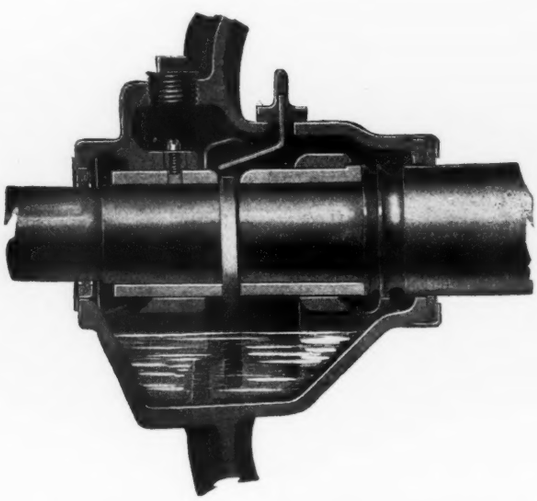
The methods used to improve the conventional bearing are comparatively simple. A connecting passage in the upper part of the bearing housing secures a condition of balanced air pressure in the separate chambers into which the housing is divided by the bearing supports. The action of the blower at high speeds sets up a vacuum next to the inside end of the housing and, since it is impossible to seal the housing absolutely at that point because the shaft passes out there, the vacuum is communicated to the space within the housing itself. If the upper passages were not provided, an unbalanced air pressure would result whenever the oil level rose high enough to close the lower cored openings.

For inspection of the oil ring, a large air-tight threaded pipe plug is provided. An enclosed combination filling and overflow opening is placed in the side of the bearing and a rigid cast iron cover is bolted over the oil ring slot and made air tight by an oil proof packing.

Where the shaft passes through the bearing, an improved method of supporting the felt dust-proofing washer is used. For the purpose of lending resilience to the soft felt, the metal cap has a diameter at least ¼ in. larger than the shaft diameter. This prevents the felt from being compressed close to the shaft, which would cause it to become glazed and hardened and soon to burn and wear out. Since it is left free to expand, it acts like a brush and does not mar or glaze.

The air tight construction of the bearing





Left: A motor bearing of the conventional design. Note the openings in the housing through which air and dust can enter the bearing, mix with the oil and then be carried into the motor windings. Right: The sealed-sleeve motor bearing, showing how effectively this bearing is sealed against the entrance of air or dust and prevents the leakage of oil or oily vapor into the motor

prevents the passage of air through the bearing and at the same time prevents oil from being drawn into the motor windings. The oil ring, carrying oil from the oil well to the motor shaft, stirs up and churns the oil into a fine spray, which, in the ordinary type of bearing, is sucked into the motor and covers the windings. The sealed-sleeve bearing is sealed so thoroughly that the escape of oil from the bearing is prevented.

The manner in which the bearing is sealed against the entrance of air makes it immune to most conditions of dirt, dust, and grit. No gritty substances can enter to mix with the lubricating oil and cause wear of the bearing shell or shaft. Clean oil is always supplied to the bearing and the life of the lubricating oil is determined not by the amount of impurities it contains but by its breakdown as a lubricating medium.

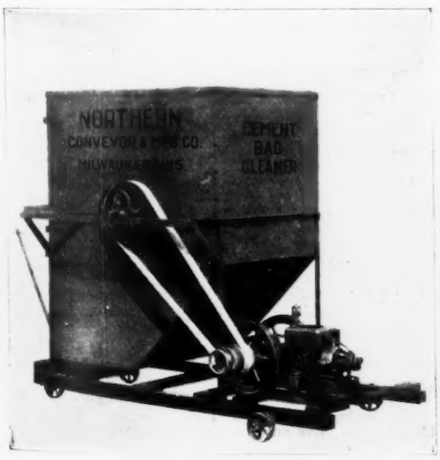
By absolutely preventing oil leakage, the sealed-sleeve bearing prevents weakening of the motor insulation by the lubricating oil and the resultant grounds and short circuits, which frequently result in delays and expensive repairs.

The bearing requires practically no attention and oiling once or twice a year is generally all that is necessary.

Cement Bag Cleaner

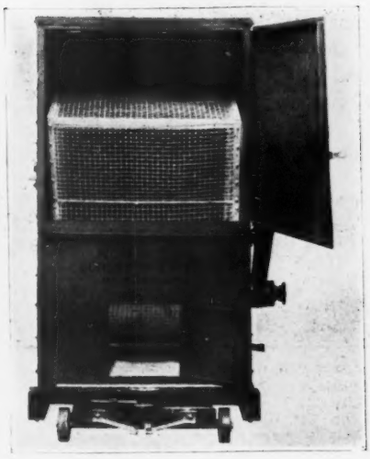
THE Northern Conveyor and Mfg. Co. of Milwaukee has recently put out a bag-cleaning machine which should interest producers, consumers, and dealers in cement.

This machine is a compact neat-looking product of steel with air-tight construction. In actual tests it has proved itself to be both economical and efficient in operation. It is possible to salvage between five and



Cement bag cleaner

twelve sacks of cement from every thousand sacks placed in the cleaner. In addition to the actual salvaging of the cement, which in itself is a considerable and worthwhile saving, there is a saving in the freight or express charges involved in shipping the empty sacks back to the warehouse or mill. After the bags have been cleaned in this



Bag cleaner opened

machine they weigh between 450 and 1000 lb. less per thousand sacks.

The cleaner is simple in design and is so constructed that repairs or replacements are almost negligible. Sacks are placed in the star-shaped screen cage shown in Fig. 1. The front door is then closed, the machine being thereby rendered air tight. The cage, which is belt driven from either a ½-hp. electric motor or a 2-hp. gasoline engine, is then revolved at a speed of 20 r.p.m. The star-shaped construction of the cage causes each sack to drop against the bottom eight times for each revolution. As the sack falls to the bottom the cement dust is loosened and passes through the screen to the bottom from which it can be shoveled out and resacked.

In addition to the air-tight feature and the star-shaped screen this machine has another advantage in the fact that it is mounted on a truck and can be moved to any portion of the plant or placed inside of a box car.

New Braunfels Limestone Company

THE New Braunfels Limestone Co.—which will be owned and operated by home capital and home men—will be located on the International & Great Northern railway tracks two miles south of town, and excavating is being done on the right-of-way for switching tracks. The following, all men well and favorably known throughout this section, have been chosen as officers and directors: Max A. Altgelt, president and general manager; Adolf Henne, vice-president; Emil Fischer, A. F. Dingel, Jacob Schmidt, Wm. Stratemann; Walter Zipp, secretary.—*New Braunsfels (Texas) Herald.*

Alunite Potash Plant for California

THE Alumite Potash Co. of America will shortly erect a plant at Martinez, Calif., for the production of potash. The company expects to turn out about 25 tons per day in the initial unit.

New Oil-Electric Locomotive

A NEW type electric locomotive, using oil for its fuel, the first of its kind ever manufactured in America, has been built jointly by the General Electric Co. and the Ingersoll-Rand Co. This locomotive has been especially designed for switching service and will be given its first practical test by the New York Central in its freight yards at Eleventh street, New York City.

The power plant equipment consists of a 300-hp. oil engine manufactured by the Ingersoll-Rand Co., directly connected to a 200-kw. General Electric generator. The motive power consists of four HM-840 motors, one of which is geared to each of the four axles. The unit has a total weight of 60 tons on the drivers.

The General Electric Co. has put about 90 self-propelled motor cars and locomotives using gasoline as fuel into service during the past 15 years, most of them still operating. The new unit is made up of well-tried apparatus as a result of this long experience. The locomotive has been in use in the yards of the Ingersoll-Rand factory at Phillipsburg, N. J., for about four months.

Portable Pumping Outfit

THE cut shows an outfit that will be handy for occasional use or where a permanent installation of pumps and motor is not justified.

The outfit is made in four sizes to handle from 300 to 900 g.p.m. The pump is either

Portable pumping outfit

a 3-in. or a 4-in. centrifugal and the horsepower of the engines runs from 15 to 30 hp.

The lift of the 3-in. size is 65 ft. or 100 ft. depending on the type and horsepower used. The 4-in. pumps will lift to 35 ft. At lower heads pumps of this design can be furnished which will deliver up to 1500 g.p.m.

The engines are all four-cylinder and of the heavy duty truck type. They are connected to the pump with a shaft and flexible coupling. The outfit is complete except for suction hose and discharge pipe.

The makers are the Barnes Manufacturing Co., Mansfield, Ohio.

News of All the Industry

Incorporations

Monterey Sand and Gravel Co., Monterey, Calif., has been incorporated for $300,000.

Star Sand and Gravel Co., Los Angeles, Calif., has been incorporated for $50,000.

San Fernando Valley Rock and Gravel Co., Los Angeles, Calif., has been incorporated for $50,000.

United Stone Co., 1421 East Main street, Lansing, Mich., has increased its capital stock from $50,000 to $100,000.

Kearns Silica Sand Co., Oak Hill, Ohio, has been incorporated for $10,000 by Charles Moreland, and A. B. Arganbright.

Flint Cinder Block and Products Co., Flint, Mich., has been incorporated for $60,000 to manufacture cinder concrete building blocks.

Gravel Production Co., Denver, Colo., has been incorporated for $50,000 by Elsie Drumm, Vivian S. Higgins, Frances Toogood, and others.

Triangle Cement Block Co., Elmont, Nassau county, N. Y., has been incorporated for $3000 by N. Decarlo, U. Pappi, and C. Imsenberry. (Attorney, E. Weaver, Whitestone, N. Y.)

Federal Block Co., Milwaukee, Wis., has been incorporated for $25,000 by Richard Rutzen, 401 Gladstone place, and others, to manufacture concrete blocks.

Vitrostone Manufacturing Co., 557 Calvert building, Baltimore, Md., has been incorporated for $25,000 by Clayton W. Hann, Henry Grau, and others.

Valley Portland Cement Co., Las Vegas, Nev., has been incorporated with 105,000 shares of nonpar value. (Las Vegas Incorporating Co., resident agent, Las Vegas, Nev.)

Virginia Lime and Stone Co., Wilmington, Del., has been incorporated for $100,000 to manufacture limestone, etc. (Attorney, F. L. Mettler, Wilmington.)

Kaufmann Duntile Co., Saginaw, Mich., has been incorporated with a capital of $10,000, to manufacture cement and concrete products. Incorporators: Henry, Alvin, and Harvey E. Kaufmann, 732 Tenth street, Saginaw, Mich.

American Leopard Stone Corp., Salisbury, N. C., has been incorporated for $500,000, by M. L. Gantt, J. K. Wilhelm, C. A. Forrest, W. H. Folder, all of Salisbury, and T. J. Smith, W. L. Robbins, and W. F. Moose, all of Concord.

Sheboygan Brick Co., Sheboygan, Wis., has been incorporated for $25,000 by Fred Heermann, Ed Grube, Fred Schocht, Herman Schuette, and Oliver McMullen, to manufacture a special concrete glazed factory brick.

Preakness Sand Co., Ratzer road, Wayne township, N. J., has been incorporated for $50,000 by John H. Sowerbutt, statutory agent, and Richard S. Sowerbutt, both of Haledon; Harry A. Brooks, 112 Ryerson avenue; and George Brooks, Jr., 1 James street.

Sand and Gravel

McColl & English, Inc., Bennettsville, S. C., a sand and gravel company, have increased their capital from $30,000 to $40,000.

West Side Gravel Co., Salem, Ore., is the name of a company recently formed by James Imlah and D. W. Pugh to engage in the sand and gravel business.

Suiter Bros., Manchester, Ohio, have contracted to furnish the state with 60,000 yd. of gravel for the A. and P. highway, according to reports from a local newspaper.

Babcock & Willcox, Kasota, Minn., operators of two gravel pits, were recently awarded a contract to supply 300 carloads of gravel for Lonsdale.

Ingham Gravel Co., Lansing, Mich., is a $200,000 corporation recently formed to remove gravel from a 33-acre field near the Red Cedar river and the Pere Marquette railroad. Sidings and loading docks are to be built on a seven-acre tract adjacent to the railroad. Operations are to start about the middle of August, it is stated.

Antoine, Ark.—Fifteen carloads of Wolf creek gravel is the tonnage that a local company proposed to ship from this point regularly as soon as the plant is equipped. The company has purchased 150 acres and estimates that it will take 25 years, at 15 cars a day, to exhaust the 1,000,000 yd. of gravel it holds in these Pike county gravel beds, according to reports.

Quarries

Labette County, Kans.—It is reported that this county is getting a new rock crusher having a capacity for about 100 yd. of rock a day, to be used on the Chetopa-Coffeyville road.

Porter & Adams, Plattsburg, Mo., is installing another crushing machine at its rock crushing plant, that will almost double the capacity of the plant.

Boutwell, Milne and Varnum Co., Graniteville, Vt., to make more efficient its quarrying operations, will erect a $50,000 machine shop on land across the road from the little depot at upper Graniteville. Work on the new plant has been begun.

Huntsville Stone and Crusher Co., Huntsville, Texas, is installing a large crusher, and shipment of rock has been suspended until the machinery is in operation. A contract to furnish 40,000 tons of rock to the federal jetties at Sabine has just been completed, according to reports.

Dolomite Products Co., Cleveland, Ohio, has taken an option on the Homer Day farm at Maple Grove near Tiffin, Ohio, it was announced recently, and the consideration is said to be $50,000. The property includes 65 acres and adjoins extensive stone quarry land now owned by the company.

Mann Iron and Steel Co., Inc., Myerstown, Penn., was awarded an order of 13,250 tons of ballast recently to be shipped in cars at the rate of 100 tons daily, through C. O. Cooke, superintendent of the Myerstown district of state highways. The Mann firm has been operating a quarry since last June in addition to the iron and steel scrap business.

Crystal Falls, Mich.—Iron county crushing plant, recently installed here, will take care of the county needs first, then the different townships. If there is any trap rock left after the wants of these inter-county demands have been met, it will be sold in open market, it is stated. A stock pile ground will be provided for crushed rock when the demand is slack.

Indiana Oolitic Limestone Co., Martinsville, Ind., has been reorganized. Preferred stock to the amount of $300,000 and common stock for $1,600,000 is to be issued. Officers have been elected as follows: President, E. C. Shireman, Martinsville; secretary, Fletcher Johnson, Bloomington; treasurer, James Royse, Terre Haute. Directors: C. A. Royse, Paul Bogart, Paul Zimmerman, Walter Ely, all of Terre Haute; Roy McNair, Indianapolis; Walter Johnson, E. C. Shireman and Ralph Lowder, of Martinsville.

Davenport, Wash.—A rock quarry has been blasted out by the state highway department on the Mecklenburg farm near Rocklyn, seven miles west of Davenport. The blast uncovered about 8000 yd. of rock, which will be crushed and used to surface the Sunset highway between Rocklyn and the George M. Wilson stock farm, near Telford. A crushing plant will be set up on the Mecklenburg farm as soon as the plant furnishes the necessary material for surfacing the Sunset highway from Creston to Telford.

Cement

Sun Portland Cement Co., Portland, Ore., formerly located in the Porter building, has moved to larger quarters in the Wilcox building.

Columbia Cement Co., Los Angeles, Calif., of which Fred A. Ballin is president, has purchased 2500 acres of land along the San Diego and Arizona railroad in Imperial county, between Dixie and Coyote Wells, formerly owned by the Southern California Marble Development Co., and plans are under way for a $1,000,000 cement plant, for the manufacture of pure white cement.

Personals

E. D. Barnett has been made superintendent of the Cowell Portland Cement Co., Cowell, Calif.

Myron Freeland, of Greensburg, Ind., has taken charge of a large stone crushing plant at Sellersburg, N. Y., 9 miles north of Albany.

Edwin R. Lee, associated in the management of the Copley Sand and Gravel Co. of Kittanning, Penn., died suddenly, May 12, of heart disease.

William A. Jarvis, of the Old Mission Portland Cement Co. in Oakland and San Jose, has been assigned to the San Francisco and Peninsula territory for that company.

W. A. Neill, head of the mechanical engineering department of the Dorr Co., will be located at the company's executive offices, 247 Park avenue, New York City, after June 15.

Arvid L. Frank, for a number of years assistant sales engineer of the Dewey Portland Cement Co., Kansas City, Mo., recently was elected vice-president in charge of sales and publicity.

E. W. Dienhart has resigned from the Portland Cement Association to become associated with the Acme Cement Products Co. at Cement City, Mich., in the capacity of general manager.

C. D. Price, for many years connected with the Industrial Works, Bay City, Mich., recently as traveling service engineer, has been appointed sales manager of the St. Louis district with headquarters in the Railway Exchange building, St. Louis, Mo.

R. Louis Nichols has been appointed manager of the Tilghman Lime and Supply Co., Fruitland, Md., it was recently announced, filling the vacancy made by Marion F. Smith, who has taken a position in the company's offices at Sallesbury, Md.

W. A. Cather, formerly in charge of advertising and sales promotion for the Worthington Pump and Machinery Corp., New York City, has been made sales manager of the Barrett Haentjens Co., maker of centrifugal pumps, and will be located in Hazleton, Penn., at the company's plant.

H. N. Spicer, of the executive staff of the Dorr Co., 247 Park avenue, New York City, will sail on June 4 for a four- to six-month tour of Europe and will cover practically every important industrial section of the Continent, making a special business survey, both in a general way and in connection with the Dorr Co.'s European business. His headquarters will be in London, at 16 S. St. E.C., but he will spend most of his time in Italy, Spain, Czecho-Slovakia, Austria, Poland, and Germany.

Manufacturers

Newark Wire Cloth Co., Newark, N. J., announces that it is now established in its new plant at 351-365 Verona avenue.

Bates Valve Bag Co., 7310 South Chicago avenue, Chicago, Ill., has placed contracts for a three-story factory, at 8240 South Chicago avenue, to cost $150,000.

Denver Rock Drill Manufacturing Co., Denver, Colo., has recently opened a Chicago branch office at 817-825 West Washington boulevard, with Mr. A. Philpott as manager.

McCord Radiator and Manufacturing Co., Detroit, Mich. Illustrated folder on Class BA force-feed lubricators for steam shovels, dredges, cranes, and heavy construction equipment.

Williams Patent Crusher and Pulverizer Co., St. Louis, Mo., announces the removal of its San Francisco offices, showrooms, and warehouse to new and larger quarters at 415 Fifth street. Oliver J. Williams, Pacific sales manager.

Sandusky Cooperage and Lumber Co., St. Louis, Mo., has announced that the district court at Toledo has approved the company's plan of reorganization, has ordered the property and business turned back to the company, and the receiver has been discharged.

Trade Literature

McGann Manufacturing Co., Inc., York, Penn. Folder illustrating and describing the York lime kiln of this company's manufacture.

Stewart Sand Co., Kansas City, Mo., has recently issued an attractive booklet describing the progress made by the company in the production of sand to meet the specifications required of it—cleanness, careful grading of sizes, and uniformity of product. The make-up and general style of the book shows that much care and thought were given to its preparation.